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THE CHOICE TO BECOME SELF-EMPLOYED AND THE DECISION TO HIRE EMPLOYEES

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Getafe, de de

A mis padres y hermanos

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Abstract

My thesis consists of three chapters. In the first chapter, *"The choice to become self-employed: acknowledging frictions"*, I develop and calibrate a search model of self-employment that is quantitatively consistent with the unemployment, paid employment and self-employment rates, the transitions between those states and the observed distribution of earnings in self-employment and paid employment. I first report evidence indicating that many individuals choose self-employment as a route out of unemployment. Using data from the European Community Household Panel (ECHP; Eurostat), I find that the proportion of unemployed entering self-employment is higher that the proportion of paid employed entering self-employment. Then I find that the earnings of the self-employed coming from unemployment are lower than the earnings of the paid employed coming from unemployment. Moreover, I find that the self-employed coming from unemployment earn less than those coming from paid employment. This evidence cannot be captured by existing theoretical models of self-employment that assume a perfectly competitive environment in the labor market and ignore market frictions such as unemployment. I construct a model of self-employment where I allow for on-the-job search in both paid employment and self-employment. Workers receive job offers from a wage distribution and business ideas from an income distribution. The model captures the fact that the self-employed earn less in median and in mean than the paid employed and that the distribution of self-employment earnings exhibits greater variation. Unemployed individuals choose self-employment with associated low incomes because their option values in self-employment are better than those in unemployment. Self-employment is a transitory state for these workers who see in self-employment a door to paid employment. The model is then used to analyze the effects of some policies that encourage self-employment.

In the second chapter, *"How does employment protection legislation influence hiring and firing decisions by the smallest firms?"* (joint with J.M. Millán, C. Román and A. van Stel), we examine the impact of employment protection legislation (EPL) on hiring decisions by own-account workers and firing decisions by very small firms (1-4 employees).

Using data from the EU-15 countries, our results show that the strictness of employment protection legislation is negatively related to both these types of decisions, and hence, to labor mobility among the smallest firms. This new evidence may be useful for governments aiming to create a more enabling macro-environment for employment and productivity growth.

Finally, in the third chapter *"Unraveling the relationship between the business cycle and the own-account worker's decision to hire employees"* (joint with J.M. Millán, C. Román and A. van Stel), We study the role of the business cycle in the individual decision of own-account workers to hire employees. Using panel data from the European Community Household Panel for the EU-15 countries, we show that own-account workers are less likely to hire employees during recessions. Next, we focus on identifying the underlying mechanisms of this negative relationship, while bearing in mind that liquidity constraints and unemployment are more common during recessions. First, we observe how liquidity constraints reduce the probability of transitioning from own-account worker to employer. Second, we find that non-higher educated own-account workers who were formerly unemployed are less likely to take on employees compared to those who were formerly in paid employment. This lower likelihood does however not seem to apply to formerly unemployed own-account workers who enjoyed tertiary education. These results suggest that formal education and former work experience are important assets for own-account workers which increase the probability that they create new jobs. This new evidence may be useful for governments aiming to stimulate employment growth.

Resumen

Mi tesis consta de tres capítulos. En el primer capítulo, *"The choice to become self-employed: acknowledging frictions"*, elaboro y calibro un modelo de búsqueda con autoempleo que es consistente cuantitativamente con las tasas de desempleo, empleo asalariado y autoempleo, las probabilidades de transición entre estos estados y las distribuciones de ganancias en el autoempleo y el empleo asalariado. Primero reporto evidencia que indica que un gran número de individuos elige el autoempleo como una vía de escape al desempleo. Usando datos del Panel de Hogares de la Unión Europea (ECHP; Eurostat), hallo que los desempleados son más propensos que los empleados asalariados a entrar en el autoempleo. También hallo que las rentas de los autoempleados que vienen del desempleo son menores que las rentas de los empleados asalariados que vienen del desempleo. Es más, los autoempleados que provienen del desempleo ganan menos que aquellos que provienen del empleo asalariado. Los modelos teóricos de autoempleo que asumen un entorno perfectamente competitivo en el mercado laboral e ignoran la existencia de fricciones como es el caso del desempleo, no son capaces de capturar esta evidencia. Construyo un modelo de autoempleo donde permito búsqueda de empleo mientras se está trabajando tanto en el empleo asalariado como en el autoempleo. Los trabajadores reciben ofertas de trabajo e ideas de negocios. El modelo captura el hecho de que los autoempleados ganan menos en media y en mediana que los empleados asalariados y que la distribución de ganancias de los autoempleados presenta una varianza mayor. Los desempleados eligen el autoempleo aunque sus ingresos sean bajos porque sus alternativas en el autoempleo son mejores que en el desempleo. El autoempleo es un estado transitorio para aquellos trabajadores que lo consideran como una entrada al empleo asalariado. Después, el modelo se usa para analizar el efecto de algunas políticas que promueven el autoempleo.

En el Segundo capítulo, *"How does employment protection legislation influence hiring and firing decisions by the smallest firms?"* (junto con J.M. Millán, C. Román and A. van Stel), examinamos el impacto de la legislación de protección al empleo sobre las decisiones de contratación por parte de los autónomos y las decisiones de despido por parte de las

pequeñas empresas (1-4 trabajadores). Usando datos de los países de la EU-15, nuestros resultados muestran que la rigurosidad de de la legislación de protección al empleo está relacionada negativamente con ambos tipos de decisiones, y por tanto, con la movilidad laboral entre las empresas más pequeñas. Esta nueva evidencia podría ser útil para los gobiernos que pretenden crear un entorno macroeconómico para el empleo y el crecimiento de la productividad.

Finalmente, en el tercer capítulo *"Unraveling the relationship between the business cycle and the own-account worker's decision to hire employees"* (junto con J.M. Millán, C. Román and A. van Stel), estudiamos el papel del ciclo economico en la decisión individual por parte de los autónomos de contratar trabajadores. Usando datos de los países de la EU-15, mostramos que los autónomos son menos propensos a contratar trabajadores durante las recesiones. A continuación, nos centramos en identificar los mecanismos subyacentes a esta relación negativa, mientras tenemos en cuenta que las restricciones de liquidez y el desempleo son más comunes durante los periodos de recesión. Primero observamos cómo las restricciones de liquidez reducen la probabilidad de transitar de autónomo a empleador. Segundo, hallamos que los autónomos que no possen educación superior y que previamente fueron desempleados son menos propensos a contratar trabajadores que aquellos que previamente fueron empleados asalariados. Sin embargo, esta menor probabilidad no parece ser aplicable a los autónomos previamente desempleados con educación terciaria. Estos resultados sugieren que la educación formal y la experiencia laboral previa son recursos importantes para los autónomos ya que incrementan la probabilidad de que creen nuevos puestos de trabajo. Esta nueva evidencia podría ser útil para los gobiernos que pretenden estimular el crecimiento del empleo.

Contents

Chapter 1

The Choice to Become Self-employed: Acknowledging Frictions

Abstract. Using data from the European Community Household Panel (ECHP; Eurostat), I develop and calibrate a search model of self-employment that is quantitatively consistent with the unemployment, paid employment and self-employment rates, the transitions between those states and the observed distribution of earnings in self-employment and paid employment. I first report evidence indicating that many individuals choose self-employment as a route out of unemployment. This evidence cannot be captured by existing theoretical models of self-employment that assume a perfectly competitive environment in the labor market and ignore, by definition, market frictions such as unemployment. I construct a model of self-employment where I allow for on-the-job search in both paid employment and self-employment. Workers receive job offers from a wage distribution and business ideas from an income distribution. The model captures the fact that the self-employed earn less in median and in mean than the paid employed and that the distribution of self-employment earnings exhibits greater variation. Unemployed individuals choose self-employment with associated low incomes because their option values in self-employment are better than those in unemployment. Self-employment is a transitory state for these workers who see in self-employment a door to paid employment. The model is then used to analyze the effects of some policies that encourage self-employment.

1.1 Introduction

The self-employed are usually classified formally as individuals who earn no regular wage or salary but who derive their income by exercising their profession or business on their own account and at their own risk (Parker, 2009; pp. 11). Self-employment is an important source of employment in developed countries. Around 15 per cent of the workforce in most OECD economies are self-employed (see OECD, Labour Force Statistics).

The common view of the self-employed is remarkably positive in both the public opinion and the literature. They are thought to be creative and highly qualified individuals who have abandoned the comfort of salaried positions to invent new products, production processes, and distribution methods. Thus, self-employed workers are generally regarded as successful entrepreneurs generating high revenues, creating employment opportunities and encouraging technological progress (Acs, 2008; Carree and Thurik, 2008; Mandelman and Montes-Rojas, 2009; Thurik et al., 2008). Policy reports also place special emphasis on entrepreneurship (see, for instance the new Europe 2020 strategy, the EU's growth strategy for the coming decade).

However, there are some puzzles regarding the choice to become self-employed. There is evidence that the self-employed are not well remunerated relative to the paid employed (evidence for the US is available in Carrington et al., 1996; Hamilton, 2000; and Kawaguchi, 2002). Using US data from the 1984 SIPP (Survey of Income and Program Participation), Hamilton (2000) estimated that (i) the self-employed earn less in median than the paid employed; (ii) relatively large proportions of the self-employed are concentrated in the lower and the upper tails of the overall income distribution compared with the paid employed (see also Goodman and Webb, 1994; for US evidence and Meager et al., 1994, 1996 for UK evidence); and (iii) assuming

an absence of market frictions in the model (such as unemployment), on average, all individuals except those in the upper quartile of the self-employment income distribution would have earned more, and enjoyed higher future income growth rates, if they had switched into paid employment.[1] Furthermore, based on US data from the Survey of Consumer Finances (SCF) and the Flow of Funds Accounts and the National Income and Product Accounts (FFA/NIPA) over the period 1989 to 1998, Moskowitz and Vissing-Jorgensen (2002) suggest that self-employment is, on average, unprofitable: returns to capital are too low and risk is too high compared to investment in public equity.

Popular explanations to these puzzles are that being self-employed gives substantial non-pecuniary benefits (Hamilton, 2000; Hurst and Pugsley, 2011) or that the self-employed are overconfident, i.e., the self-employed think they will do better than they actually do (De Meza and Southey, 1996). Thus, some individuals might 'voluntarily' enter self-employment for reasons such as independence, job satisfaction and/or anticipated higher incomes. On the contrary, self-employment may constitute a far less desirable state chosen reluctantly by individuals unable to find a job in paid employment under the prevailing labor market conditions. Thus, Evans and Leighton (1989) and Carrasco (1999) examine the effect of being unemployed on the decision to become self-employed. Evans and Leighton use data from the National Longitudinal Survey of Young Men (NLSYM; 1966-1981) for the US whereas Carrasco's work is based on the Household Budget Continuous Survey (ECPF; 1985-1991) for Spain. They find that unemployment increases the likelihood of entering self-employment. Finally, based on the Working and Living

[1] Net profit which is the standard measure reported in data sets, is generally an accounting profit that may be used as the basis for the calculation of net income for tax purposes and is therefore thought to understate the true profits of business owners. To deal with the potential underreporting problem by the self-employed, Hamilton constructs alternative measures of self-employment earnings. He uses two alternative measures, the draw (i.e. amount withdrawn in the form of salary by the entrepreneur) and the equity-adjusted draw, which is the sum of the draw in period t and the change in business equity between the beginning of period t and period $t+1$.

Conditions Survey (ECVT; 1985) for Spain and the Displaced Worker Survey (DWS; 1984, 1986 and 1988) for the US, Alba-Ramirez (1994) find that the duration of unemployment increases the probability of becoming self-employed. Therefore, some individuals might be 'pushed' into self-employed as the only available route out of unemployment.

In this sense, we observe a growth of (mainly empirical) works devoted to the analysis of the determinants of the decision to become self-employed (see Parker's 2009 handbook for a recent review). The number of theoretical contributions on this, however, has been rather low to date (see works by Lucas, 1978; Jovanovic, 1994; and Rissman, 2003, 2007 as notable exceptions), and have certain limitations.

My goals in this paper are threefold. First, on the basis of data drawn from the European Community Household Panel (ECHP; Eurostat), I document some empirical facts on earnings from self and paid employment and transitions to self-employment from both paid employment and unemployment. Among other regularities, I report that (i) unemployed workers are more likely to enter self-employment than paid employed workers are; (ii) the self-employment sector does not pay well, on average, as compared to the paid employment sector (the self-employed earn less in mean and median relative to the paid employed; and self-employment incomes are more unequal than paid employed)**;** and (iii) those entering self-employment from unemployment have lower earnings than those entering self-employment from paid employment. This gives support to the view of self-employment as the only available alternative to unemployment for certain groups.

The second goal of the paper (and the most important contribution) is to develop and calibrate a model that acknowledges frictions and can jointly replicate the empirical evidence about earnings and transition chances to and from self-employment discussed above.

This model is an extension of the standard search model of unemployment originally due to McCall (1970) where I allow for self-employment and on-the-job search on both paid employment and self-employment. In the model, individuals (either paid employed, self-employed or unemployed) receive job offers from a given wage distribution. Workers also receive business ideas. Those ideas are associated with a self-employment income which is drawn from an income distribution. Both job offers and ideas arrive at a different rate for unemployed, paid employed and self-employed workers.

The calibrated model is able to reproduce well transitions between unemployment, paid employment and self-employment, and income distributions as observed in the data. It also does a good job in capturing the unemployment, paid employment and self-employment rates. The model is also useful to understand individual self-employment choices and heterogeneity. In this sense, we divide the self-employed into two groups: those with earnings lower than the median paid employed and those with earnings higher than the median paid employed. The model predicts that the transition pattern of those two groups is quite different and that low income self-employment is a less 'stable' group. In particular, the majority of the transitions from unemployment to self-employment are to lower income self-employment, which is also supported by the data. Moreover, most of the transitions from self-employment to paid employment come from the group of the lower income self-employed, which is consistent with the data as well. Unemployed workers choose self-employment despite the corresponding low income because their option values in self-employment are better than those in unemployment. Therefore, they find in self-employment a good route to find a paid employment job.

Finally, the model is used to evaluate the economic and societal benefits of public policies encouraging self-employment (i.e. start-up incentives) which is the third and last goal of the paper. The results show that those policy beneficiaries

would have entered self-employment even without the start-ups incentives. As a consequence, those policies have small effects on the transitions from unemployment to self-employment, leaving the self-employment and unemployment rates practically unchanged.

Existing attempts to develop theoretical models trying to explain self-employment choice typically assume a perfectly competitive environment in the labor market (i.e. Walrasian models) in which workers choose between paid employment and self-employment (Lucas, 1978; Jovanovic, 1994). In consequence, the existing models ignore market frictions such as unemployment, by definition. Further, in these models workers enter self-employment if and only if they get higher revenues in this state than in paid employment. Hence, these analyses cannot capture the fact that the self-employed earn less in mean and median than the paid employed.

To the best of my knowledge, the use of search models including the possibility of being self-employed is only available in papers by Rissman (2003 & 2007) and Narita (2011). As an advantage, their approach also allow for the state of unemployment. However, a contribution of my approach is that, unlike Rissman (2003 & 2007), I am able to explain the earnings puzzle. Also, I do not restrict worker's transition behavior. In Rissman (2003) self-employment offers low and fixed earnings and by assumption, it is considered as an inferior state compared to paid employment. Hence the transitions from paid employment to self-employment are excluded from her framework. Concerning Rissman (2007), her work focuses on modeling the transitions among the three labor market states of unemployment, paid employment, and self-employment. In her model, and unlike mine, the paid employed are not allowed to search on the job, and the arrival rates of business ideas and job offers are the same for all workers (they do not depend on their employment state). As an advantage, my model explains the earnings puzzle. Further, my

model also allows to match the transitions between unemployment, paid employment and self-employment states and the corresponding rates (whereas Rissman's model overstates the transition from paid employment into self-employment and understates the transition from self-employment into paid employment, leading to a self-employment rate which is too high and a paid employment rate which is too low relative to what is observed in the data). Narita (2011) develops a life cycle search model which accounts the three main categories of employment of a developing economy: formal wage earners, informal wage earners and self-employed. She finds that the model reproduces well the composition of workers over the life cycle as observed in Brazilian data. She analyzes the welfare implications of policies which attempt reducing informality finding that, when job offers from informal sector firms become inexistent to those unemployed, most of informal sector wage earners become self-employed, having small effects on unemployment, while worker's welfare does not increase either. In this paper, I abstract from informality to characterize the environment in Europe. In her model, individuals can only move into self employment from unemployment and not from searching on the job. In contrast, I also allow for individuals entering self-employment from paid employment which is important to explain worker's outside options and their employment choices. While her model estimates of the mobility rates from self-employment to (formal) paid employment are very low in general, they are relatively high in my model where many workers enter paid employment from self-employment.

The remainder of this paper is structured as follows. Section 1.2 focuses on documenting empirical facts on European data. Section 1.3 describes the model, and Section 1.4 calibrates it. Section 1.5 presents the main quantitative results and Section 1.6 focuses on the policy analysis. Finally, the concluding remarks of the study are put forth in Section 1.7.

1.2 Empirical facts on European data

This section describes some empirical regularities about earnings and transition rates to and from self-employment using European data, which will serve as the empirical reference to be replicated by the later development and calibration of my model. In particular, I use data from the ECHP which is a standardized multi-purpose annual longitudinal survey carried out at the level of the EU-15. It is designed and coordinated by the Statistical Office of the European Communities (EUROSTAT). The target population of the ECHP consists of people living in private households in the national territory of each country. This panel offers information on 60,500 nationally representative households, which include approximately 130,000 individuals aged 16 years and older. One of its attractive features is the high level of comparability across countries and over time. Thus, using the same questionnaire, all members of the selected households in the participating countries are interviewed about issues relating to demographics, labor market characteristics, income, and living conditions. Additional details on the ECHP data can be found in Peracchi (2002).

I restrict my sample to males between the ages of 25 and 59 who report being unemployed, paid employed or self-employed.[2] By doing so, I exclude from my analysis the potential distorting effects of incorporating relatively less stable groups within the labour force. In particular, compared with individuals within the 25-59 age band, those younger individuals are more likely to be enrolled in education whereas elder individuals are more likely to be retired. For the paid employed and self-employed sample, I also exclude those individuals who work part-time (less than

[2] Individuals can also self-classify themselves in the following categories: (i) working with an employer in paid apprenticeship; (ii) working with an employer in training under special schemes related to employment; (iii) unpaid work in a family enterprise; (iv) in education or training; (v) retired; (vi) doing housework, looking after children or other persons; (vii) in community or military service; and (viii) other economically inactive.

25 hours per week) and those who work in the agricultural sector.[3]

Table 1.1 summarizes the descriptive statistics of individuals by employment status. On average, and compared with paid employed individuals, self-employed (i) are 2.1 years older; (ii) present lower levels of educational attainment; (iii) work about 10 hours more per week; and (iv) are more likely to work in the construction and services sectors, and less likely to work in the industrial sector.

Table 1.1. Descriptive statistics

Status	UN	PE	SE
	(n=19,163)	(n=170,461)	(n=33,254)
Age (years)	39.7	40.1	42.2
	(10.8)	(9.3)	(9.1)
Recognised third level education (ISCED 5-7)	13.5%	24.9%	21.8%
Second stage of secondary level education (ISCED 3)	31.6%	37.1%	31.1%
Less than second stage of secondary education (ISCED 0-2)	54.9%	38.0%	47.1%
# of hours working per week	—	42.4	52.5
	—	(7.3)	(12.6)
Working in the industrial sector [a]	—	30,8%	16,4%
Working in the construction sector [b]	—	12,0%	21,5%
Working in the services sector [c]	—	57,3%	62,2%

Notes:

(i) standard deviations for continuous explanatory variables in parentheses

(ii) [a] NACE-93 codes C, D and E; [b] NACE-93 code F; [c] NACE-93 codes G to Q

The transition probabilities between the states of unemployment, paid employment and self-employment for the entire sample are shown in Table 1.2. From this table, it can be observed how unemployed workers look more likely to enter self-employment than paid employed workers. Thus, some individuals might

[3]Sweden has to be excluded from my analysis because this country presents missing values for relevant variables in the analysis.

see in self-employment a route out of unemployment, in the absence of wage work opportunities. Further, the relatively high chances of entering paid employment from self-employment may indicate that some workers consider self-employment as a stepping-stone to paid employment.

Table 1.2. Transition probabilities (in %)

	Status in t+1		
Status in t	UN	PE	SE
UN	65.3	30.1	4.6
PE	2.4	96.2	1.4
SE	1.3	6.7	92.0

The same transition probabilities are shown in Table 1.3 for selected groups of countries: Nordic, Anglo-Saxon, Continental and Mediterranean.[4] As expected, some differences emerge for these groups. These rates, however, follow the similar patterns to those observed for the entire sample.

Table 1.3. Transition probabilities for group of countries (in %)

	Nordic			Anglo-Saxon			Continental			Mediterranean		
	Status in t+1			*Status in t+1*			*Status in t+1*			*Status in t+1*		
Status in t	UN	PE	SE	UN	PE	SE	UN	PE	SE	UN	PE	SE
UN	62.11	35.84	2.05	71.63	22.77	4.60	70.18	29.82	2.18	62.69	30.53	6.78
PE	1.66	96.90	1.44	1.71	96.75	1.54	2.42	96.94	0.64	3.05	94.46	2.49
SE	1.00	10.41	88.58	0.96	7.55	91.49	0.87	4.84	94.29	1.57	6.58	91.85

Table 1.4 reports information on annual earnings for self-employed and paid employed workers.[5] From this information it can be checked whether the stylized facts about the particular distribution of earnings among both groups described in

[4] Sapir (2005) sees the European countries as falling into this four categories.

[5] In order to create comparable incomes for both groups, two filters have been applied to the subsample of paid and self-employed individuals included in Table 1. First, we excluded all individuals that reported earnings equal to 0 (which primarily affected the group of self-employed individuals). Second, in order to strictly present yearly incomes, we restricted our sample to the group of individuals that declared being either paid or self-employed from January to December during period $t-1$.

the previous section are confirmed by this data. In particular, I am interested in comparing earnings of both self and paid employed and test whether (i) the self-employed earn less in mean and/or in median relative to the paid employees; and (ii) self-employment incomes are more unequal than paid employed. In this vein, both facts are confirmed by the descriptive statistics. This comparison suggests that the self-employment sector does not pay well, on average, as compared to the paid employment sector.

Table 1.4. Annual earnings of paid and self-employed workers

Status	PE (n = 153,097)	SE (n = 27,700)	Income differences between SE and PE (%)
Mean (st. dev.)	18,252	17,469	-4,3%
	(11,326)	(29,994)	
Percentiles			
10%	9,394	4,093	-56,4%
25%	12,487	8,174	-34,5%
50%	16,118	13,156	-18,4%
75%	21,148	20,004	-5,4%
90%	28,767	31,717	10,3%
95%	35,271	45,077	27,8%
99%	54,902	88,687	61,5%

Note: Net annual Incomes earned either as paid or self-employed during period t-1, converted to average € of 1996, being corrected by purchasing power parity (across countries) and harmonised consumer price index (across time).

Table 1.5. Annual log earnings of paid and self-employed workers

	Q10		Q25		Q50		Q75		Q90		Q95		Q99	
Independent variables (x)	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Main predictor														
SE (ref. PE) [a]	-0.903	-212.8***	-0.299	-100.8***	-0.069	-25.7***	0.098	28.4***	0.254	52.66***	0.374	54.7***	0.628	36.7***
Demographic characteristics														
Age (years)	0.056	38.8***	0.055	55.1***	0.057	63.2***	0.058	50.6***	0.058	36.5***	0.062	27.4***	0.062	11.3***
Age squared	-0.001	-33.3***	-0.001	-47.1***	-0.001	52.8***	-0.001	-40.6***	-0.001	-27.5***	-0.001	-20.3***	-0.001	-7.6***
Basic education [a] (ref.)														
Secondary education [a]	0.095	24.6***	0.103	41.7***	0.115	50.2***	0.133	44.0***	0.151	36.4***	0.172	29.1***	0.219	15.0***
Tertiary education [a]	0.244	60.2***	0.288	101.1***	0.352	134.3***	0.431	124.7***	0.505	101.5***	0.552	76.7***	0.638	34.2***
Constant	7.930	257.6***	8.141	427.5***	8.270	427.5***	8.401	343.0***	8.531	250.1***	8.545	176.8***	8.817	75.5***
Number of observations							180,797							
Number of individuals							43,720							

Notes:

(i) Standard errors are adjusted for intra-individual correlation when estimating by OLS.

(ii) Given the dependent variable is expressed in natural logarithms, these coefficients effects can be interpreted as the percent change in earnings with respect to predicted earnings for sample means in case of continuous variables. In the context of dummy variables, it reflects the percent change in earnings for a discrete change of the dummy variable from 0 to 1.

(iii) [a] Dummy variable

(iv) Business sector, country and time dummies are included in all regressions, although coefficients are not presented.

(v) *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

Table 1.4 only offers a descriptive comparison without taking into account the role of some well known predictors of earnings. In order to correct this limitation I estimate earnings equations to compare earnings for self and paid employed individuals where some demographic information as well as business sector, country and time dummies are included in the regressions. Given the skewness observed in the data, quantile regressions are used.[6] These results are presented in Table 1.5.

In coherence with that obtained in the descriptive analysis, these results show how self-employment earnings are lower than paid employment ones at 0.1, 0.25 and 0.5 percentiles and higher at percentiles 0.75, 0.9, 0.95 and 0.99. Further, as most empirical studies, I find a positive non-linear impact of age on earnings. The educational attainment of the individual also seems to matter. Thus, as compared with those individuals with basic education, those with secondary education and those with university studies obtain higher incomes.

Table 1.6 aims to provide further evidence on the effect on earnings of different occupational choice decisions for unemployed individuals. In particular, I estimate earnings equations using OLS and random effects panel data models to compare earnings for self and paid employed individuals entering from unemployment during their first year as self or paid employed.[7] The panel data structure of the ECHP allows me to follow the same individuals during the observation window (1994-2001). Thus, those who reported to be self-employed in t and unemployed in $t-1$ were classified as self-employed coming from unemployment (UN $\rightarrow$ SE),

[6] Some limitations arise from these methods. Perhaps, more importantly they do not correct for unobserved heterogeneity. Toward this end, earning equations were also run by means of both random and fixed effects estimations. These results (not reported for brevity) confirm that self-employed earn less relative to paid employees. These models, however, are not exempt from limitations, either. First, these models do not compare earnings in selected quantiles. Second, these models assume that all individuals are ex-ante identical. There might be however heterogeneity in unobserved characteristics (i.e. workers would not be ex-ante identical) that may affect occupational choices.

[7] Fixed effects panel data models cannot be applied given the relatively small data set in this exercise. The same occurs in Table 7.

whereas those who reported to be paid employed in t and unemployed in $t-1$ were classified as paid employed coming from unemployment (UN → PE).

Table 1.6. Annual log earnings of paid and self-employed workers entering from unemployment

	OLS		RE	
Independent variables (x)	Coeff.	t-stat.	Coeff.	t-stat.
Main predictor				
UN → SE (ref. UN → PE) [a]	-0.3560	-4.20***	-0.3691	-7.88***
Demographic characteristics				
Age (years)	0.0148	0.95	0.0128	0.76
Age squared	-0.0002	-0.95	-0.0002	-0.75
Basic education [a] (ref.)				
Secondary education [a]	0.0119	0.32	0.0164	0.41
Tertiary education [a]	0.0636	1.34	0.0647	1.43
Constant	9.1123	27.87***	9.1480	25.22***
Number of observations	1,184			
Number of individuals	1,171			

Notes:

(i) Standard errors are adjusted for intra-individual correlation when estimating by OLS.

(ii) Given the dependent variable is expressed in natural logarithms, these coefficients effects can be interpreted as the percent change in earnings with respect to predicted earnings for sample means in case of continuous variables. In the context of dummy variables, it reflects the percent change in earnings for a discrete change of the dummy variable from 0 to 1.

(iii) [a] Dummy variable

(iv) Business sector, country and time dummies are included in all regressions, although coefficients are not presented.

(v) *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

The dependent variable is the annual log income for paid employed or self-employed that come from unemployment. To ensure comparability, the same filters applied in Tables 1.4 and 1.5 have been used (see footnote 6). Our main predictor

(UN $\rightarrow$ SE) has a strong negative effect meaning that those self-employed individuals coming from unemployment earn, on average, 37 percent less than those unemployed entering salaried work.[8] It could be argued that some unemployed becoming self-employed would probably prefer a job in paid employment but the lack of salaried jobs may have 'pushed' them into self-employment.[9]

As regards our control variables, our results show marginally significant differences between those self or paid employed individuals (entering from unemployment) with tertiary education compared to those holding only primary education.

Table 1.7 aims to compare earnings of self-employed depending on whether they entered from unemployment or paid employment. Thus, those who reported to be self-employed in $t, t-1, \ldots, t-i+1$ and unemployed in $t-i$ for some $i \in \{1, \ldots, 6\}$ were classified as self-employed coming from unemployment (UN $\rightarrow$ SE), whereas those who reported to be self-employed in $t, t-1, \ldots, t-i+1$ and paid employee in $t-i$ for some $i \in \{1, \ldots, 6\}$ were classified as self-employed coming from paid employment (PE $\rightarrow$ SE). I am interested in individuals that remained in the same business during the period $t, \ldots, t-i+1$. Therefore, in order to be classified as UN $\rightarrow$ SE or PE $\rightarrow$ SE, I also impose that the individual reports that the year he started his job (as self-employed) was the same for every $t, \ldots, t-i+1$.[10] I also make use of both OLS and random effects panel data models where the dependent variable is the annual log income for self-employed that come from unemployment

[8] Quantile regressions were also used as a robustness check. These results show how earnings of those unemployed entering self-employment are only higher than earnings of those entering paid employment from percentile 0.9 onwards. Hence, for the subsample of those previously unemployed, differences in earnings in favor of self-employed seem to be more pronounced.

[9] An alternative explanation might be the fact that some time can be needed until a business generates substantial profits and, hence, earnings can be low the first years operating a business. However, salaries are also more likely to be low during first years. In this vein, we estimated complementary regression to observe evolution of earnings for both self and paid employees during their first 4 years within the same business or salaried job position. Our results indicate that, 4 years after starting, earnings of self and paid employed increases by about 28% and 9.5%, respectively. In other words, we observe some degree of convergence in earnings for both groups but differences in favor of paid employees are still noticeable. These estimations are not presented for brevity and are available upon request.

[10] Actually, the year that the individual started working should be $t-i+1$.

or paid employment.

Table 1.7. Annual log earnings of self-employed workers entering from unemployment or paid employment

	OLS		RE	
Independent variables (x)	Coeff.	t-stat.	Coeff.	t-stat.
Main predictor				
UN → SE (ref. PE → SE) [a]	-0.2052	-2.44**	-0.1866	-2.01**
Demographic characteristics				
Age (years)	-0.0077	-0.17	0.0152	0.30
Age squared	0.0001	0.19	-0.0002	-0.29
Basic education [a] (ref.)				
Secondary education [a]	-0.0412	-0.46	0.0087	0.10
Tertiary education [a]	-0.1117	-0.95	-0.0243	-0.22
Duration dependence				
Job tenure as self-employed (years)	0.1212	3.84***	0.1184	3.55***
Constant	8.0887	6.40***	7.3265	6.15***
Number of observations	988			
Number of individuals	491			

Notes:

(i) Standard errors are adjusted for intra-individual correlation when estimating by OLS.

(ii) Given the dependent variable is expressed in natural logarithms, these coefficients effects can be interpreted as the percent change in earnings with respect to predicted earnings for sample means in case of continuous variables. In the context of dummy variables, it reflects the percent change in earnings for a discrete change of the dummy variable from 0 to 1.

(iii) [a] Dummy variable.

(iv) Business sector, country and time dummies are included in all regressions, although coefficients are no tpresented.

(v) *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

It can be observed that self-employed incomes are about 19% lower for those entering from unemployment, as compared to those who started from paid employment. This may reflect that unemployed workers that become self-employed have a

lower reservation wage than the one of those entering from paid employment.[11] In other words, unemployed individuals might be willing to start up even if expected profits are low (i.e. necessity based decision) whereas paid employees would enter self-employment if expected profits are sufficiently high (i.e. opportunity based decision). Finally, we observe as each additional year of experience as self-employed increase earnings by about 12% whereas we do not identify any significant effect of formal education.

1.3 The model

1.3.1 Model description

In this section I present the basic environment. There is a continuum of risk-neutral and infinite-lived workers. All workers are ex ante identical. The measure of workers is normalized to one. Workers discount time at rate β.

At any point in time a worker can be in one of three distinct states: unemployed, paid employed or self-employed. Unemployed individuals enjoy some flow utility b (typically including the value of leisure and unemployment insurance benefits). Job offers arrive randomly at rate λ_i, $i \in \{un, pe, se\}$, where un, pe and se denote unemployment, paid employment and self-employment respectively. Therefore, I allow those job offer arrivals rates to be different for unemployed, paid employed and self-employed workers. When an offer arrives, the individual has the option of accepting a wage w which is randomly drawn from the known and fixed distribution $F_{PE}(w)$. A paid employed worker loses her job with probability δ_{pe}.

To become self-employed, workers first need to have a business idea. Business ideas arrive randomly at rate ζ_i, $i \in \{un, pe, se\}$. Thus, also business ideas

[11] As robustness, quantile regressions were also used. As expected, earnings for those entering from paid employment are higher for all percentiles.

arrive at a different rate to unemployed, paid employed and self-employed workers. Each idea has associated a self-employment income x which is randomly drawn from the known and fixed distribution $F_{SE}(x)$. The self-employed have their business failing for exogenous reasons at rate δ_{se}.

Let U be the value of being unemployed. U satisfies the following Bellman equation:

$$\begin{aligned} U = b + \beta\lambda_{un} E_w \left[\max\left\{V^{PE}(w), U\right\}\right] + \\ +\beta\zeta_{un} E_x \left[\max\left\{V^{SE}(x), U\right\}\right] + \beta(1 - \lambda_{un} - \zeta_{un})U \end{aligned} \tag{1.1}$$

Where $V^{PE}(w)$ is the value of a paid employed worker with wage w and $V^{SE}(x)$ the value of a self-employed worker with income x. Unemployed workers receive flow utility b. At rate λ_{un} they receive a job offer. They will accept the job offer if the expected value is greater than the value of unemployment. Analogously, an unemployed worker will receive a business idea at rate ζ_{un}. They will implement that idea if the expected value is greater than the value of unemployment. If they receive neither a job offer nor a business idea, they will remain unemployed next period.

The value function of a paid employed worker with wage w is given below:

$$V^{PE}(w) = w + \beta\lambda_{pe}E_{w'}\left[\max\left\{V^{PE}(w'), V^{PE}(w)\right\}\right] +$$

$$+\beta\zeta_{pe}E_x\left[\max\left\{V^{SE}(x), V^{PE}(w)\right\}\right] + \tag{1.2}$$

$$+\beta\delta_{pe}U + \beta(1 - \lambda_{pe} - \zeta_{pe} - \delta_{pe})V^{PE}(w)$$

Paid employed workers receive wage w. They can receive another job offer while paid employed at rate λ_{pe} that they will accept if the expected value is greater than the value of paid employment with wage w. Paid employed workers receive business ideas at rate ζ_{pe}. They lose their job with probability δ_{pe}. If they receive neither another job offer nor a business idea nor a job destruction shock, they will remain paid employed with wage w next period.

The value function of a self-employed worker with income x is:

$$V^{SE}(x) = x + \beta\lambda_{se}E_w\left[\max\left\{V^{PE}(w), V^{SE}(x)\right\}\right]$$

$$+\beta\zeta_{se}E_{x'}\left[\max\left\{V^{SE}(x'), V^{SE}(x)\right\}\right] \tag{1.3}$$

$$+\beta\delta_{se}U + \beta(1 - \lambda_{se} - \zeta_{se} - \delta_{se})V^{SE}(x)$$

Self employed workers receive income x. They receive a job-offer at rate λ_{se}.

They will accept this job offer if the expected value is greater than the value of self-employment with income x. Self-employed workers can receive another business idea which arrives at rate ζ_{se}. The self-employed have their business destroyed with probability δ_{se}. If they receive neither a job offer nor another business idea nor a job destruction shock, they will remain self-employed with income x next period.

1.3.2 Steady state

In steady-state, the value functions U, $V^{PE}(w)$, $V^{SE}(x)$ solve (1), (2) and (3) for every w in the support of the wage distribution and every x in the support of the self-employment income distribution. Those policies imply distributions of wages across paid employed $\tilde{F}_{PE}(w)$ and income across self-employed $\tilde{F}_{SE}(x)$. Given those policy values, also unemployment, paid employment and self-employment rates can be derived as well as transition probabilities between those three states. Next I will define the reservation wages and incomes.[12] Let w^R_{un}, be the reservation wage for which the worker is indifferent between remaining unemployed and becoming paid-employed. Analogously, let x^R_{un} be the reservation productivity for which the worker is indifferent between remaining unemployed and becoming self-employed:

$$U = V^{PE}(w^R_{un}) = V^{SE}(x^R_{un})$$

I will also define $x^R_{pe}(w)$ as the reservation income that makes the worker indifferent between being paid employed at wage w and self-employed with income $x^R_{pe}(w)$.

[12] I checked numericaly that $V^{PE}(w)$, $V^{SE}(x)$ are increasing in w and x respectively (see figure 1.1 below).

$$V^{SE}(x^R_{pe}(w)) = V^{PE}(w)$$

Similarly, let $w^R_{se}(x)$ be the reservation wage for which the worker is indifferent between being self-employed with productivity x and paid employed with wage $w^R_{se}(x)$:

$$V^{PE}(w^R_{se}(x)) = V^{SE}(x)$$

Let un, pe and se be the unemployment, paid employment and self-employment rates. Since the measure of workers is normalised to one, $un = 1 - pe - se$. Workers flow from unemployment to paid employment at rate $\lambda_{un}(1 - F_{PE}(w^R_{un}))$, which is equal to the product of the job offer arrival rate and the probability that a randomly generated offer exceeds the reservation wage w^R_{un}. They flow from unemployment to self-employment at rate $\zeta_{un}(1 - F_{SE}(x^R_{un}))$ that is equal to the product of the ideas arrival rate and the probability that the randomly generated income associated to an idea exceeds the reservation income x^R_{un}. Workers flow from paid employment and self-employment to unemployment at the exogenous rates δ_{pe} and δ_{se}. In steady state, outflow equals inflow:

$$\left[\lambda_{un}(1 - F_{PE}(w^R_{un})) + \zeta_{un}(1 - F_{SE}(x^R_{un}))\right] un =$$

$$= \delta_{pe} pe + \delta_{se} se \tag{1.4}$$

By analogous reasoning, the flow of unemployed workers who obtain a job in paid employment paying w or less is $\lambda_{un}(F_{PE}(w) - F_{PE}(w^R_{un}))un$. The flow of the self-employed accepting a job paying w or less is $\lambda_{se} se \int_{\underline{x}}^{\bar{x}} \left[F_{PE}(w) - F_{PE}(w^R_{se}(x))\right] 1(V^{PE}(w) > V^{SE}(x)) d\tilde{F}_{SE}(x)$, where $\underline{x}$ and $\bar{x}$ are the lower and upper support of the income distribution across self-employed. Because the paid employed only flow from lower- to higher-paying jobs, the sum of both is the total flow into the set of the paid employed with wage w or less. The flow out of this subset of paid employed workers is the flow of those who lose their jobs, equal to $\delta_{pe}\tilde{F}(w)pe$ plus the flow of those who enter self-employment, plus the flow of those who find jobs in paid employment paying more than w. In steady state, the flow into the subset of the paid employed with wages w or less equals the flow out of this subset:

$$\lambda_{un}(F_{PE}(w) - F_{PE}(w^R_{un}))un + \lambda_{se} se \int_{\underline{x}}^{\bar{x}} \left[F_{PE}(w) - F_{PE}(w^R_{se}(x))\right] 1(V^{PE}(w) > V^{SE}(x)) d\tilde{F}_{SE}(x) =$$

$$= \left[\delta_{pe}\tilde{F}_{PE}(w) + \lambda_{pe}(1 - F_{PE}(w))\tilde{F}_{PE}(w) + \zeta_{pe}\int_{\underline{w}}^{w} (1 - F_{SE}(x^R_{pe}(w^*)) d\tilde{F}_{PE}(w^*)\right] pe \tag{1.5}$$

where $\underline{w}$ is the lower support of the wage offer distribution Analogously, the inflow and outflow in the subset of the self-employed with income x or less equals:

$$\zeta_{un}(F_{SE}(x) - F_{SE}(x^R_{un}))un + \zeta_{pe}pe\int_{\underline{w}}^{\bar{w}} \left[F_{SE}(x) - F_{SE}(x^R_{se}(w))\right] 1(V^{SE}(x) > V^{PE}(w))d\tilde{F}_{PE}(w) = \tag{1.6}$$

$$\left[\delta_{se}\tilde{F}_{SE}(x) + \lambda_{se}\int_{\underline{x}}^{x}(1 - F_{PE}(w^R_{se}(x^*)))d\tilde{F}_{SE}(x^*) + \zeta_{se}(1 - F_{SE}(x))\tilde{F}_{SE}(x)\right] se =$$

where $\bar{w}$ is the upper support of the wage offer distribution

1.4 Calibration

Since the model cannot be solved analytically, it is simulated numerically. The data used in the estimation is based on the ECHP which was described in section 2. European countries vary in their labor market policies. In particular, in their protection against uninsurable labor market risk (like unemployment benefits or employment protection legislation, which protects workers against firing). Those policies are likely to affect the transitions between the states of unemployment, paid employment and self-employment as well as the earnings distributions. For the calibration, I choose a group of homogeneous countries in terms of unemployment policies. This is the group of the Continental countries (Austria, Belgium, France and Germany). Table A1 illustrates the unemployment replacement rates and duration for these countries. It can be observed that the unemployment insurance in those countries is, on average, similar. Table A2 shows how there are not big differences between

them in terms of employment protection. Further, it can be observed from table A3 that the employment rates, with the exception of Belgium, are not very different.

I choose the wage offer distribution F_{PE} and the self-employment income distribution F_{SE} to be log normal, so that $log(w) \sim N(\mu_{PE}, \sigma^2_{PE})$ and $log(x) \sim N(\mu_{SE}, \sigma^2_{SE})$.[13] I set the time period to be one quarter, which is lower than the frequency of the employment data I use because typical job finding rates are higher. The data used to compute some of the targets have annual frequency, and I aggregate the model appropriately when matching those targets. The discount rate is set so that the implied yearly interest rate is 3 percent and hence $\beta = 0.9925$. The rest of the parameters are set to match some moments in the data. Several data targets are chosen and the log squared distance between them and the equivalent statistics produced in the benchmark model economy is minimized with respect to those parameters. The parameters left to be set are:

- Unemployed's flow utility: [b], 1 parameter;
- Job and business destruction rates $[\delta_{pe}, \delta_{se}]$, 2 parameters;
- Arrival rates of job offers $[\lambda_{un}, \lambda_{pe}, \lambda_{se}]$, 3 parameters;
- Arrival rates of business ideas $[\zeta_{un}, \zeta_{pe}, \zeta_{se}]$, 3 parameters;
- Coefficients of the log normal distribution functions for paid employment wages and self-employment income $[\mu_{pe}, \sigma_{pe}, \mu_{se}, \sigma_{se}]$, 4 parameters.

I choose the values for those 13 parameters to pin down the following moments generated by the model:

- The unemployment and paid employment rates (2 targets),

[13] Log normality is a reasonable assumption about the realized distribution of wages observed in the data.

- The annual transition probabilities (6 targets):

  1. from paid employment to unemployment
  2. from self-employment to unemployment
  3. from unemployment to paid employment
  4. from unemployment to self-employment
  5. from paid employment to self-employment
  6. from self-employment to paid employment

- The transition probabilities (2 targets):

  1. from self-employment to paid employment after 2 years without interruption in self-employment
  2. from paid employment to self-employment after 2 years without interruption in paid employment.

- The mean and standard deviation of the residuals from Mincer equations for paid and self-employed (4 targets).

- The difference between the means of the residual from Mincer earnings equations for paid employment wages and self-employment income of workers coming from unemployment (1 target).

I use the residuals from the earnings distributions because workers are homogeneous in the model. I estimate the equation $\ln z_{it} = \beta_0 + controls + \varepsilon_{it}$ where z is equal to the wage if the individual declares to be paid-employed and is equal to self-employment income if the individual declares to be self-employed. I control for age, education, sector, country and waves. Then I calculate the mean and standard deviation of the residuals ε_{it} for both paid and self-employed.[14]

[14] For the last target, I calculate the mean of the residuals ε_{it} from the previous regression for paid and self-employed coming from unemployment and take the difference.

With the 6 independent transitions (between UN, PE and SE), the fraction of people in unemployment, paid employment and self-employment would be determined in steady state. In reality, the economy is not in steady state. The transition rates are estimated with error and thus, the stocks will not be consistent with the transition rates (when applying the steady-state equations). Therefore, the stocks contain useful information about past transition behavior, so they help to pin down the transition matrix more precisely.

I choose these moments because I would like the model to capture the earnings and transitions observed in the data. The last moment is chosen so that the model captures the self-employed earning less than the paid-employed when coming from unemployment. As observed in section 1.2, it is a salient feature that the self-employed coming from unemployment are in worse shape than the paid employed coming from unemployment. Intuitively, the moments for the rates and the transition probabilities contain information about the parameters for the job and ideas arrival rates and the destruction rates. The moments on the transition probabilities between paid employment and self-employment after 2 consecutive years, together with the same annual transition rates, are used to learn about the arrival rate of job offers to paid employed (λ_{pe}), and the arrival rate of ideas to self-employed (ζ_{se}). They capture how quickly the transition from self-employment to paid employment (resp. from PE to SE) declines with time spent in self-employment (resp. in PE). And thus, these statistics indirectly capture how fast the paid employed move up the job ladder and the self-employed move up the SE ladder. The earnings residuals are closely related to the parameters of the coefficients of the income distributions.

The performance of the model in matching calibration targets is described in Table 1.8.

Table 1.8. Matching the moments

Moment	Value	
	Data	Model
av log inc PE	0.035	0.002
sd log inc PE	0.394	0.551
av log inc SE	-0.271	-0.242
sd log inc SE	1.072	1.020
av. log. inc UN→PE – av. log. inc. UN→SE	0.632	0.678
Unemployment rate	0.071	0.058
Paid employment rate	0.845	0.827
Transition prob. UN→PE	0.298	0.290
Transition prob. UN→SE	0.022	0.023
Transition prob. PE→SE	0.006	0.006
Transition prob. SE→PE	0.048	0.045
Transition prob. PE→UN	0.024	0.021
Transition prob. SE→UN	0.009	0.008
Transition prob. PE→SE (2 years)	0.031	0.042
Transition prob. SE→PE (2 years)	0.006	0.006

The economic environment presented and estimated above generates an economy which closely follows certain labor features of the Continental countries. However, the average income in paid employment is slightly too low and the average income in self-employment is slightly too high. Calibrated parameter values can be found in Table 1.9. The values for the calibrated parameters imply that the self-employed receive both job offers and business ideas with a much higher frequency than the unemployed and the paid employed. In addition, the failure rate is lower for the self-employed as compared with the paid-employed. As a consequence, the option values of the self-employed are high compared to the ones of the paid-employed.

Table 1.9. Calibrated Parameter Values

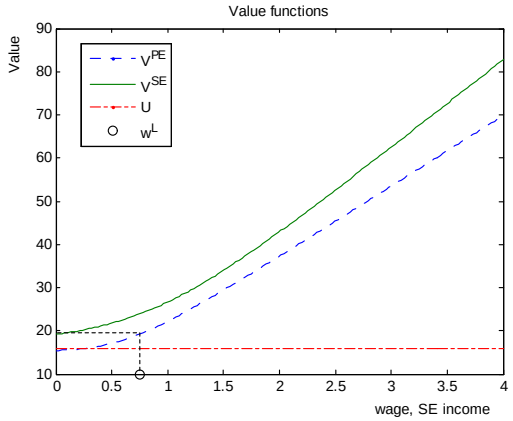
Parameter	Value	Parameter	Value
b	0.000		
δ_{pe}	0.006	δ_{se}	0.002
λ_{un}	0.301	ζ_{un}	0.007
λ_{pe}	0.216	ζ_{pe}	0.004
λ_{se}	0.965	ζ_{se}	0.023
μ_{pe}	-1.845	μ_{se}	-1.443
σ_{pe}	0.877	σ_{se}	0.925

The value U, and the value functions $V^{PE}(w)$ and $V^{SE}(x)$ are plotted in figure 1 as a function of w and x. The value functions for the paid and the self employed are increasing in w and x respectively. The value of being self-employed is always higher than the value of being unemployed. That is, $V^{SE}(x) > U$ for every possible x in the support. It can be observed how for the same level of earnings, the value of being self-employed is higher than the value of being paid employed. That is, $V^{SE}(z) > V^{PE}(z)$ for all z. It can also be observed from figure 1.1 that there exists some wage w^L such that the paid employed with wages $w < w^L$, will implement any idea they receive.[15] Therefore, both the unemployed and the paid employed with low wages will implement any business idea they receive. The self-employed with low incomes wait until they draw a high wage in paid employment or a better self-employment idea. They do not accept low wages in paid-employment because next period, if they remain self-employed, they will receive another job offer with a high probability. Therefore, the earnings of the self-employed are lower than the earnings of the paid employed. The values of the coefficients of the log normal distributions imply a larger variance on the self-employment income distribution $F_{SE}(x)$ than in the paid employment wage distribution $F_{PE}(w)$. The self-employed in the upper tail of the equilibrium income distribution have been lucky enough

[15] If $w < w^L$, then $V^{SE}(x) > V^{PE}(w)$ for all x.

to get a good business idea. The self-employed with high incomes often come from another business because the arrival rate of ideas for the self-employed is higher than the one for the paid employed. On the other hand, as previously discussed, those in the lower tail of the realized self-employment income distribution accepted those ideas because of the better option values of self-employment. All this can explain the larger variance on the self-employment income distribution compared with the paid employment wage distribution.

Figure 1.1. Value functions



The parameter value of the job arrival rate when self-employed λ_{se} is particularly high. This is in part due to the high transition rate from self-employment to paid-employment in the data. Also, this is necessary to make self-employment more valuable than paid-employment and thus, to explain the mean earnings in paid and self-employment.

Table 1.10. Effects of a decrease in the arrival rate of job offers when self-employed λ_{se}

λ_{se}	0.965	0.550
av log inc PE	0.002	-0.044
sd log inc PE	0.551	0.542
av log inc SE	-0.242	-0.114
sd log inc SE	1.020	0.924
av. log. inc UN→PE – av. log. inc. UN→SE	0.678	0.652
Unemployment rate	0.058	0.056
Paid employment rate	0.827	0.823
Transition prob. UN→PE	0.290	0.301
Transition prob. UN→SE	0.023	0.023
Transition prob. PE→SE	0.006	0.005
Transition prob. SE→PE	0.045	0.034
Transition prob. PE→UN	0.021	0.021
Transition prob. SE→UN	0.008	0.008
Transition prob. PE→SE (2 years)	0.031	0.033
Transition prob. SE→PE (2 years)	0.006	0.004

Table 1.10 compares the effects of decreasing λ_{se} from 0.965 to 0.550.[16] When λ_{se} decreases, the transition rates from self-employment to paid-employment and from paid employment to self-employment decrease. Also, the average earnings of the paid employed decrease whereas the ones of the self-employed increase. Further, standard deviations of both paid and self-employed decrease. Those effects are mainly a consequence of a decrease in the difference between V^{SE} and V^{PE} for low w and x.[17]

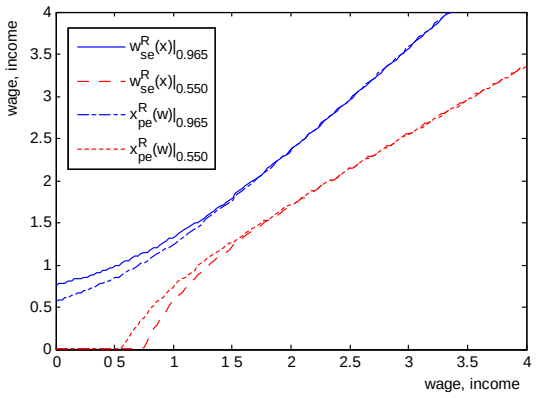
Figure 1.2 compares the effect of decreasing λ_{se} on reservation paid employment wages for the self-employed as a function of their income $w^R_{se}(x)$ and reservation

[16] For $\lambda_{se} > 0.220$, still $V^{SE} > U$. The value of $\lambda_{se} = 0.550$ was chosen as an illustration. Instead, any $\lambda_{se} \in [0.220, 0.967]$ could have been chosen and the effects would have been qualitatively the same.

[17] All else equal, the decrease in λ_{se} imply worse option values for the self-employed and, consequently, V^{SE} decreases. Therefore, $V^{SE}(z) - V^{PE}(z)$ becomes smaller.

self-employment income for the paid employed as a function of their wages $x^R_{pe}(w)$.[18] For low values of w and x, as λ_{se} decreases, $w^R_{se}(x)$ decreases while $x^R_{pe}(w)$ increases. Since $w^R_{se}(x)$ decreases, the low-income self-employed accept more low-wage paid employment. At the same time, the increase in $x^R_{pe}(w)$ makes the paid employed with lower earnings less likely to implement low-income self-employment ideas.[19] Consequently, the mean wage of the paid employed would decrease whereas the mean income of the self-employed would increase.[20] For higher values of w and x there is essentially no change. As it has been shown, a high value of λ_{se} is necessary to capture the earnings distributions as observed in the data.

Figure 1.2. Effects of decreasing λ_{se} from 0.967 to 0.550 on $w^R_{se}(x)$ and $x^R_{pe}(w)$



1.5 Results

In order to better understand the mechanism of the model, I will study separately the pattern of the self-employed with low incomes from those with high incomes. I will show that the transition patterns are different for both groups. This is closely related

[18] Obviously, $x^R_{pe}(w)$ and $w^R_{se}(x)$ are simetric with respect to the 45^0 line.

[19] Also notice that w^L decreases for a lower value of λ_{se}. Thus, the number of paid employed that implement any idea they receive also decreases.

[20] Again, for any $\lambda_{se} \in [0.220, 0.967]$, the effects would be quantitatively the same.

with the literature on "Necessity" and "Opportunity" self-employment. Since 2001, the Global Entrepreneurship Monitor (GEM) has discussed two rather different types of self-employed (see Reynolds et al., 2002). The differentiation focuses on the motivation of the entrepreneur to start his or her venture. On the one hand, those who have chosen to be self-employed to take advantage of a market opportunity are defined as opportunity self-employed. On the other hand, those who have chosen to be self-employed by lack of salaried jobs are defined as necessity self-employed.[21]

I divide the self-employed into two groups: necessity self-employed and opportunity self-employed. I will use the following approach to identify those two groups. I define someone as necessity self-employed if he accepted the typical job in paid employment. By typical, I take the median paid employed. Let w^{med} be the wage of the median paid employed worker. Then, the threshold x^{NE} is obtained from the model satisfying the equation[22]:

$$V^{SE}(x^{NE}) = V^{PE}(w^{med}) \tag{1.7}$$

I define the self-employed with incomes below x^{NE} as necessity self-employed and the self-employed with incomes above x^{NE} as opportunity self-employed. Table 1.11 describes the transitions from unemployment and paid employment to necessity and opportunity self-employment generated by the model. Table 1.12 contains the transitions from necessity and opportunity self-employment to any other state. As mentioned earlier, the model predicts that the transition pattern of those two groups is quite different. In particular, necessity self-employment is a less 'stable' group. Most of the transitions from unemployment to self-employment are to necessity

[21] Opportunity and necessity entrepreneurs are defined by individual's answers to a survey question. Each respondent was asked to indicate whether he was starting and growing his business to take advantage of a unique market opportunity (opportunity entrepreneurship) or because it was the best option available (necessity entrepreneurship).

[22] x^{NE} is well defined since $w^{med} > w^{L}$

self-employment. Moreover, the majority of the self-employed who enter paid employment are the necessity self-employed. Therefore, they find in self-employment a good route to find a paid employment job. By contrast, the transitions out of opportunity self-employment are scarce. Thus, the mechanism of the model is the following. Unemployed or paid employed with low wages choose self-employment despite having low self-employment incomes because their option values in self-employment are better than those in unemployment and in paid employment. They stay in self-employment until they find a better paid employment job. For them, self-employment is a transitory state.

Table 1.11. Annual Transition Probabilities to Necessity and Opportunity Self-employment

	Status in *t+1*			
	Model		Data	
Status in t	SE^{NE}	SE^{OP}	SE^{NE}	SE^{OP}
UN	0.020	0.003	0.015	0.008
PE	0.004	0.001	0.003	0.002

Table 1.12. Annual Transition Probabilities from Necessity and Opportunity Self-employment to Other States

Model				
	Status in *t+1*			
Status in t	UN	PE	SE^{NE}	SE^{OP}
SE^{NE}	0.008	0.091	0.889	0.012
SE^{OP}	0.008	0.017	0.000	0.975
Data				
Status in t	UN	PE	SE^{NE}	SE^{OP}
SE^{NE}	0.006	0.141	0.615	0.237
SE^{OP}	0.000	0.014	0.143	0.842

Tables 1.11 and 1.12 also describe the transitions between the four states of unemployment, paid employment, necessity self-employment and opportunity self-

employment observed from the data.[23] Since I calibrated to the Mincer residuals, I apply to the data the threshold x^{NE} obtained in the model. In the data, I define someone who is self-employed as necessity self-employed if the Mincer residual is less than $log(x^{NE})$. In the contrary case, I define this self-employed as opportunity self-employed. By doing so, I can compare the results generated by the model with the observations from the data. The transition pattern generated by the model is confirmed by the data. Note that those transitions are not a target in the calibration. The transitions that the model is not able to capture are those from necessity self-employment to opportunity self-employment and from opportunity self-employment to necessity self-employment. This can be expected for two reasons. First, in the model the self-employed cannot go voluntarily from a higher to a lower income in self-employment without a period of unemployment. Since the time period is set quarterly, the few transitions from opportunity self-employment to necessity self-employment correspond to opportunity self-employed that had their business destroyed and entered necessity self-employment after some spell of unemployment. Second, self-employment incomes presumably have high variation from one year to the other making self-employment earnings uncertain. This uncertainty is not present in the model since the self-employed will get at least the same income in period $t+1$ as in period t if their business is not exogenously destroyed, i.e., if they do not become unemployed. The failure of the model to capture these transitions suggests that idiosyncratic uncertainty in self-employment incomes may then be important to understand these transitions.

Figure 1.3 characterizes the transition pattern of the necessity self-employed.

[23] The sample used to construct tables 11 and 12 is slightly different from the sample used in the calibration. It is necessary to take into account the self-employment income variable to differentiate between necessity and opportunity self-employed. Individuals declare their income corresponding to the year prior to the survey. In order to strictly present yearly incomes, it is necessary to obseve the incomes in $t+1$ and $t+2$ of the self-employed individuals in t and $t+1$ respectively. Therefore, individuals are followed for 3 consecutive periods whereas they were only observed for 2 consecutive periods in the calibration.

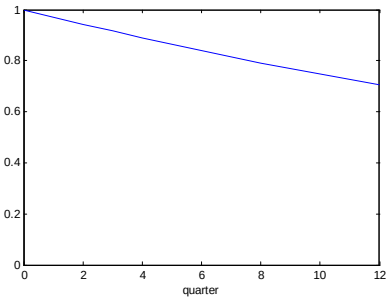
I start at $t = 0$ with the entire pool of the necessity self-employed, that are distributed according to $\tilde{F}_{SE}(x)$ with x below x^{NE}. Panel (a) shows the percentage of the necessity self-employed at $t = 0$ that have not transitioned to another state, as a function of time.[24] At $t = 0$ this percentage equals one. As it can be observed, necessity self-employment is a transitory state. After one year ($t = 4$), about 11 percent of the necessity self-employed moved to another state. Panels (b), (c) and (d) show the percentage of the necessity self-employed at $t = 0$ who have made at least one transition to unemployment, paid employment or opportunity self-employment respectively as a function of time (I am not considering any event that happens after this first transition). At $t = 0$ this percentage equals zero. The results indicate that most of the transitions out of necessity self-employment occur to paid employment.[25]

[24] Time period is equal to one quarter

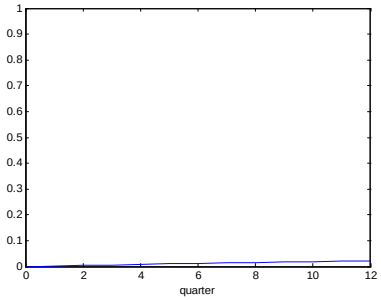
[25] At every t, the four transition percentages sum up to one.

Figure 1.3. Evolution of the Necessity Self-employed.

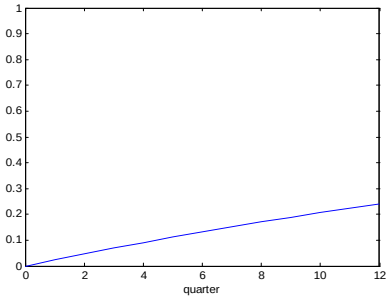
(a). Necessity Self-employed who have not Transitioned to other States



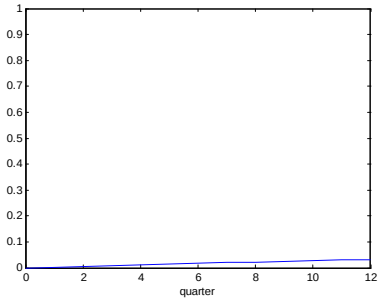
(b). Transitions from Necessity Self-employment to Unemployment



(c). Transitions from Necessity Self-employment to Paid Employment



(d). Transitions from Necessity to Opportunity Self-employment



1.6 Comparative Statics

In this section, I evaluate the effect of some policies encouraging self-employment. In particular, I will intend to replicate the "Bridging Allowance" policy which is a real policy that has been implemented in Germany since 1985. Unemployed individuals who want to start their own business, are supported by the 'Bridging Allowance' (BA, Überbrückungsgeld) programme (see Pfeiffer and Reize, 2000; Caliendo, 2008). Its main goal is to cover basic costs of living and social security contributions during the initial stage of self-employment. BA supports the first 6 months of self-employment by providing the same amount as a recipient of a BA

would have received if he or she had remained unemployed. (plus a lump sum to cover social security contributions).

Following the BA, some start-up incentives are given to the unemployed workers who enter self-employment. Those start-up incentives consist on certain amount of money k that the self-employed coming from unemployment receive during their first period as self-employed. As in the BA policy, we will set k equal to 6 months of unemployment benefits. Since the unemployment benefits are not explicitly defined in the model[26], I will consider them equal to 50% of the mean income of a worker. In the benchmark case, the unemployment benefits caused certain Government spendings To keep the Government spending constraint, the unemployment benefits will be changed accordingly (i.e. depending on how the unemployment rate varies after implementing the policy, the unemployment benefits will decrease or increase).

Table 1.13 compares some moments generated by the model with and without start-up incentives. It can be observed that the results with and without start-up incentives are very similar. The transitions from unemployment to self-employment and the unemployment and self-employment rates are practically unchanged. The reason is that for a given level of earnings, the value of being self-employed is very high and consequently, the unemployed would implement any business idea they would receive. Therefore, these policy beneficiaries would have entered self-employment even without the start-ups incentives. In our model economy, the start-up incentive policy has redistribution effects. Compared with the benchmark case, the amount of unemployment benefits that the unemployed receive decrease. The reduction on unemployment benefits compensates the spending on start-up incentives

[26] b which was defined as the flow income of unemployment, can be thought as $b = b_1 + b_2$, where b_1 is the monetary unemployment benefit (paid by the government) and b_2 is the leisure value (if positive) or stigma and boredom (if negative).

paid to the unemployed who enter self-employment. However, this redistribution has small effects in the unemployment and self-employment rates.[27]

The model presented here sheds doubt on the view that encouraging self-employment will be beneficial for growth. In this sense, more self-employment does not necessarily mean more "entrepreneurship". Instead, it may put workers in a fair less desirable situation where they are not very productive. More research is needed to determine the effects of these policies in the data.

Table 1.13. Moments generated by the model with and without start-up incentives.

Moment	without start-up incent.	with start-up incent.
av log inc PE	0.002	0.002
sd log inc PE	0.551	0.551
av log inc SE	-0.242	-0.242
sd log inc SE	1.020	1.020
av. log. inc UN→PE – av. log. inc. UN→SE	0.678	0.678
Unemployment rate	0.058	0.058
Paid employment rate	0.827	0.827
Transition prob. UN→PE	0.290	0.290
Transition prob. UN→SE	0.023	0.023
Transition prob. PE→SE	0.006	0.006
Transition prob. SE→PE	0.045	0.045
Transition prob. PE→UN	0.021	0.021
Transition prob. SE→UN	0.008	0.008
Transition prob. PE→SE (2 years)	0.042	0.042
Transition prob. SE→PE (2 years)	0.006	0.006

1.7 Conclusion

The main contribution of this paper is to build a model of self-employment with frictions that quantitatively explains the unemployment, paid employment and self-

[27] I plan to study what happenen in the data when such subsidies were given

employment rates, the transitions between those states and the observed distribution of earnings in self-employment and paid employment.

Toward this end, I first show evidence indicating that many individuals choose self-employment as a route out of unemployment. Among other regularities, I document that (i) unemployed workers are more likely to enter self-employment than paid employed workers are; (ii) self-employment sector does not pay well, on average, as compared to paid employment; and (iii) those entering self-employment from unemployment have lower earnings than those entering self-employment from paid employment which gives support to the view of self-employed as the only available alternative to unemployment for certain groups. These facts motivate extending the existing theoretical works.

The model, once calibrated to the group of the Continental countries by means of data from the European Community Household Panel (ECHP; Eurostat), captures the fact that the self-employed earn less and have larger earning variance than the paid employed. It also predicts that self-employment is a temporary option for many workers. Thus, most of the self-employment with low incomes came from unemployment. These individuals, despite having low earnings, enter self-employment because their option values in self-employment are better than those in unemployment. For those workers, self-employment is seen as a door to paid employment. The model is then used to determine the effects of some policies that encourage self-employment.

The paper highlights the importance of considering unemployment when studying the decision to enter self-employment. The analysis can be extended in several directions. In the benchmark model self-employment income is not subject to uncertainty. Therefore, the income of self-employed individuals that do not change of job or business, will not change from one period to the other. It would be

interesting to study the effect on individuals choices of allowing for variation in the self-employment income. Another interesting extension would be to study the transitions between unemployment, paid employment and self-employment over the life cycle.

1.8 Appendix

Table A1. Net unemployment replacement rates and duration.

		Replacement Rate	Duration
Austria	1^{st} period	55%	30-52 weeks
	2^{nd} period	50%	indefinite[a]
Belgium	1^{st} period	60%	1 year
	2^{nd} period	42-60%[b]	indefinite
France	1^{st} period	Max{40.4% + €11.34/day, 57.4%}	7-26 months
	2^{nd} period	up to 461 euros/month[c]	6 months (renewable)
Germany	1^{st} period	60-67%	1 year[d]
	2^{nd} period	53-57%	indefinite

Notes:

(i) [a]Applicants must be in serious need of financial support, after taking the income of the partner and exemption limits into account. After a period of six months the level of the income support depends on the length of time for which the claimant previously received the unemployment benefit.

(ii) [b]If partner is earning, the benefit is reduced to 35 per cent. This reduced amount is paid for three months only, plus an additional three months for each year the worker had been in work before he became unemployed. After that period, benefits are further reduced to around €13 per day.

(iii) [c]If monthly net income less than 605,60 euros, otherwise reduced accordingly.

(iv) [d]Longer for people 45 and over (up to 32 months depending on age).

Table A2. OECD Indicators on Employment Protection*

	Austria	Belgium	France	Germany
Average 1994-2001	2.21	2.53	2.62	2.99

Note:*This indicator is intended to measure the strictness of EPL and is scaled to lie between 0 and 6, from less to more protected workers.

Table A3. Employment rates (in %)

	Austria	Belgium	France	Germany
State				
SE	7.14	12.14	8.98	7.57
PE	87.67	81.20	82.43	83.66
UN	5.18	6.66	8.59	8.77

Chapter 2

How does employment protection legislation influence hiring and firing decisions by the smallest firms?

(joint with J. Millán, C. Román and A. van Stel)

Abstract. This paper examines the impact of employment protection legislation (EPL) on hiring decisions by own-account workers and firing decisions by very small firms (1-4 employees). Using data from the EU-15 countries, our results show that the strictness of employment protection legislation is negatively related to both these types of decisions, and hence, to labour mobility among the smallest firms. This new evidence may be useful for governments aiming to create a more enabling macro-environment for employment and productivity growth.

2.1 Introduction

The global economy faces a threatening downward spiral as a result of the financial and economic crisis of 2008. In some European economies, the problem is strongly exacerbated by a substantial increase in unemployment rates and a decrease in competitiveness. Therefore, the challenge is not just to start and strengthen the economic resurgence, but also to ensure this recovery is accompanied by employment and productivity growth. In this respect, there is near consensus among academics and policymakers that entrepreneurship is a major driver of economic growth, job creation, and competitiveness in global markets. Consequently, any successful strategy to get out of the jobs crisis should recognize entrepreneurship as a key element.[1] There is a heated debate in Europe, however, about the role of labour market regulation (Millán *et al.*, 2012; Román *et a*l., 2011, 2013). On the one hand, strong employment protection is good for employees as it protects their rights. Hence, in environments with strong employment protection, the number of job dismissals is likely to be lower. On the other hand, it may not be so good for unemployed individuals since the risk for entrepreneurs of hiring an employee is bigger: if it turns out the new employee does not perform as well as expected, or if the firm is forced to downsize due to external circumstances, the costs of dismissing the employee are relatively high. This increased risk of hiring employees related to strong employment protection may make entrepreneurs more cautious to take on employees. And in an environment where the entrepreneur's risk of hiring people is higher, the number of new jobs created is also likely to be lower. So, while strong employment protection may be good for individuals *having* a job (the 'insiders'), it may not be so good for individuals *looking for* a job (the 'outsiders'). This paradox is known as the insider-outsider problem of employment protection (see Lindbeck and Snower, 2001

[1] The key role of entrepreneurship as a major driver of economic growth, job creation, and competitiveness in global markets has been well documented in academic publications (see Van Praag and Versloot, 2007 for a comprehensive survey) and policy reports (see, for instance, the new Europe 2020 strategy).

for a survey).

Strict employment protection may thus lower the levels of both hiring and firing of employees. This, in turn, may cause levels of labour mobility – the movement of workers between firms – to be lower as well. As labour mobility between firms is an important source of knowledge spillovers, and thereby of productivity growth (Stephan, 1996; Breschi and Lissoni, 2001; Cooper, 2001; Power and Lundmark, 2004), the impact of Employment Protection Legislation (henceforth EPL) on hiring and firing decisions is an important topic of investigation.[2] In this paper we empirically investigate if and to what extent strict EPL (i) prevents the hiring of employees by own-account workers; and (ii) hampers the firing of employees by employers of very small firms (1-4 employees). We focus on the smallest firm category because EPL disproportionally affects the smallest firms, as in these firms the hiring and firing costs are bigger relative to total labour costs. In other words, small firms suffer a scale disadvantage when EPL is high. Moreover, in small firms there is less flexibility to accommodate a poorly performing worker towards a different occupation within the firm (Parker, 2007, p. 704). Hence, the impact of EPL on hiring and firing decisions, and hence on the level of labour mobility, is expected to be especially strong for (very) small firms. In our empirical analysis, random effects logit models are applied to individual level data drawn from the European Community Household Panel for the EU-15 countries. The individual level data are complemented by a macro level indicator reflecting the strictness of employment protection, developed by OECD.

[2] Although a positive impact on productivity growth may be associated with lower employment levels (as the same output can be produced with less workers), empirical evidence points in the opposite direction: regions that achieve productivity growth often also achieve employment growth because the market volume increases as a result of increased competitiveness (Fritsch, 2008).

2.2 State of the art

The literature on the determinants of job creation by the self-employed remains rather limited: see, for example, Carroll et al. (2000) and Mathur (2010) for the US; Westhead and Cowling (1995), Burke et al. (2000, 2002, 2009), Cowling et al. (2004) and Henley (2005) for the UK; and Congregado et al. (2010) for the EU-15. As regards job dismissals by the group of employers, the literature only adopted tangential approaches to the phenomenon by means of survival analysis: see, for instance, Millán et al. (2013) for the EU-15. To the best of our knowledge, an analysis of the impact of the strictness of employment protection on the individual decisions of (i) own-account workers to hire employees; and (ii) employers to fire employees, does not exist to date. This is the research gap we are aiming to fill in the current paper.

2.3 Methods

2.3.1 Data

We use data from the European Community Household Panel (henceforth ECHP) covering the period 1994-2001.[3] The ECHP, designed and coordinated by EUROSTAT, is a standardised multi-purpose annual longitudinal survey carried out at the level of the EU-15.[4] Additional details on the ECHP data can be found in Peracchi (2002).

2.3.2 Sample

Two different samples are used in this analysis where, as usual, persons younger than 18 and older than 65, workers in the agricultural industries and those individuals

[3] The ECHP data are used with the permission of Eurostat (contract ECHP/2006/09, held with the Universidad de Huelva).

[4] France, Luxembourg and Sweden were excluded from our analysis because these countries presented missing values for several relevant variables.

working part-time are excluded. Our first sample includes individuals who are own-account workers for some particular period and then either change their labour force status to employers employing between 1 and 4 employees or remain as own-account workers at a later period. This dataset yields 8,380 observations (3,324 individuals) of which 1,201 (14.3%) refer to transitions to employer. Our second sample includes individuals who are employers employing between 1 and 4 employees for some particular period and then either change their labour force status to own-account workers or remain as employers at a later period. This second dataset yields 6,912 observations (2,911 individuals) of which 945 (13.7%) refer to transitions to own-account worker.[5]

2.3.3 Estimation methods

We use random effects binary logit models that control for unobserved heterogeneity across individuals. Models that control for unobserved heterogeneity across countries are used as robustness checks (not shown for brevity, but available on request). Both approaches yield similar results. Furthermore, both these approaches show no major changes relative to simple pooled regressions (also not shown). This suggests that, even if some unobserved heterogeneity may exist, it does not affect our estimates.

2.3.4 Measures

2.3.4.1. Dependent variables (Data source: ECHP)

Transitions from own-account worker to employer (1-4 employees): The dependent variable is a discrete variable that equals 1 for individuals who are own-account workers in period t and become employers in a firm with 1-4 employees in period

[5] The exclusion of those employers employing more than 4 employees reduces the number of transitions from own-account worker to employer with 133 observations. Similarly, the number of transitions from employer to own-account worker is reduced with 149 observations. As a robustness check, we also estimated our models using data of all employer sizes. Results are qualitatively the same as presented in Table 2, and are available on request.

t+1. Note that such a transition implies hiring of new employees. It equals 0 for individuals who remain as own-account workers in periods t and t+1.

Transitions from employer (1-4 employees) to own-account worker: The dependent variable is a discrete variable that equals 1 for individuals who are employers in a firm of 1-4 employees in period t and become own-account workers in period t+1. Note that such a transition may imply firing of employees. It equals 0 for individuals who remain as employers in periods t and t+1.

2.3.4.2. Independent variables

Main explanatory variable: EPL (Data source: OECD Employment Database)

This indicator is intended to measure the strictness of EPL and is scaled to lie between 0 and 6, from less to more protected workers. As defined by the OECD, EPL refers to regulations about hiring (e.g., rules favouring disadvantaged groups, conditions for using temporary or fixed-term contracts, and training requirements) and firing (e.g., redundancy procedures, mandated pre-notification periods and severance payments, special requirements for collective dismissals, and short-time work schemes).

As an illustration, Figure 2.1 shows the evolution of the EPL index for selected countries with different levels of labour market stringency. On average for the countries in our data sample, the EPL-index slightly decreases over the period considered. Furthermore, Table 2.1 summarizes the specific legislative changes associated with the within-country variation of the EPL index in these countries. See OECD (1999, 2004) for additional details.

Control variables (Data source: ECHP)

The empirical models include some sets of explanatory variables at the individual level that are known to influence entrepreneurial performance: demographic

characteristics, formal education, incomes, job characteristics and country dummies (see Parker, 2009 and Millán et al., 2012 for overviews). The inclusion of country dummies combined with the fact that our EPL-variable is time-dependent allows us to pick out the effect of an increase in EPL over time within the same country, as opposed to capturing the impact of simple cross-country variations. To make sure our EPL variable does not –erroneously– capture business cycle effects (which also relate to variations over time), we also incorporate a variable from ECHP labeled *household perception of economic climate*.[6]

2.4 Results and discussion

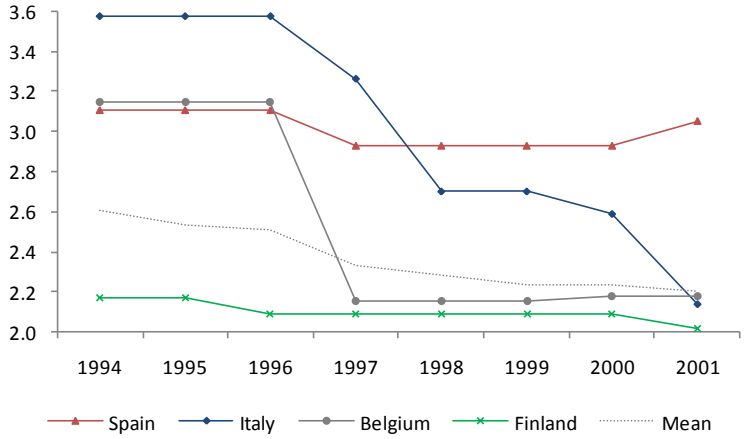
Estimation results are presented in Table 2.2. We use the same estimation strategy in both models by using three different specifications. Our first specification includes all but one control variables (demographic characteristics, formal education, incomes and job characteristics) as predictors, and serves as our baseline model (Baselines A and B). Our second specification then adds the OECD measure of employment protection described in subsection 3.4.2 (Models 1A and 1B). Finally, our third specification also incorporates the *household perception of economic climate* variable, and serves as a robustness check of our results (Models 2A and 2B).[7] Each specification is presented in a two-column format. The first column shows the marginal effects whereas t-statistics are presented in the second column.[8]

[6] This variable (i) equals 1 for households considering the present economic situation unfavourable for making large purchases; (ii) equals 2 for households considering the present economic situation not favourable but also not unfavourable for making large purchases; and (iii) equals 3 for households considering the present economic situation favourable for making large purchases. Hence, the expected effect of this variable on hiring (firing) decisions is positive (negative). We use perception data at the individual level rather than business cycle indicators at the aggregate level, since it is the perception of the individual entrepreneur that ultimately influences the decision to hire or fire employees. Reassuringly though, correlations between country averages derived from this variable and aggregate business cycle indicators like the unemployment rate are high, significant and in the expected direction.

[7] Since data for the *household perception of the economic climate* are not available for Germany, we will use this variable only in a robustness test.

[8] The robustness of our t-statistics has been checked by re-estimating them from variance-covariance matrices of the coefficients obtained by bootstrapping.

Figure 2.1. Evolution of the EPL index for selected countries



Notes: Mean refers to the EU-15 countries in our sample (excluding France, Luxembourg and Sweden)
Source: OECD Employment Database

Table 2.1. Legislative changes affecting EPL index for selected countries

Country	Year	Reform description	EPL index
Belgium	1997	Restrictions on TWA were reduced and FTC were made renewable	-
	2000	Tightening of rule concerning notice period and compensation in case of unjustified dismissal for blue-collar workers	+
Finland	1996	Notice period was halved for workers with tenure less than 1 year	-
	2001	The new employment contract act came into force reducing notice periods further	-
Italy	1997	*Treu package* on FTC widened the number of valid cases for the use of FTC	-
	1998	TWA were permitted	-
	2000	Reform of TWA 2000 extended the use of TWA and removed the restrictions concerning unskilled workers	-
	2001	Legislative Decree no. 368/2001 expanded valid cases for the use of FTC	-
Spain	1997	Maximum compensation for unfair dismissal was reduced and some changes were made to the definition of fair dismissal	-
	2001	Law 12/2001 tightened the rules governing valid cases for the use of FTC	+

Notes: TWA (temporary work agencies); FTC (fixed-term contracts)
Source: OECD (2004), Table 2.A2.6, pp. 119-120.

Table 2.2. Determinants of the transitions

Transitions	**From own-account worker to employer**						**From employer to own-account worker**					
Model	**Baseline A**		**Model 1A**		**Model 2A**		**Baseline B**		**Model 1B**		**Model 2B**	
Predicted probability (*y*)	0.120		0.118		0.115		0.095		0.092		0.091	
Independent variables (*x*)	*dy / dx*	t-stat.	*dy / dx*	t-stat.	*dy / dx*	t-stat.	*dy / dx*	t-stat.	*dy / dx*	t-stat.	*dy / dx*	t-stat.
Employment protection												
EPL index *(0-6)*			-0.068	-3.64***	-0.072	-3.64***			-0.072	-4.12***	-0.089	-4.65***
Business cycle												
Household perception of economic climate *(1-3)* [a]					0.021	4.37***					0.002	0.41
Demographic characteristics												
Female [b]	-0.005	-0.61	-0.005	-0.56	-0.006	-0.67	0.016	1.66*	0.016	1.70*	0.020	1.98**
Age (*18-65*)	-0.001	-0.46	-0.001	-0.42	-0.001	-0.38	-0.003	-0.88	-0.003	-0.94	-0.003	-0.98
Age (squared)	-1.0E-06	-0.03	-2.6E-06	-0.07	-2.3E-06	-0.06	3.7E-05	1.00	3.8E-05	1.06	4.4E-05	1.14
Cohabiting [b]	0.012	1.33	0.012	1.28	0.011	1.1	-0.011	-1.02	-0.011	-1.05	-0.010	-0.87
Number of children under 14	-0.003	-0.60	-0.003	-0.62	-0.002	-0.54	-0.003	-0.79	-0.003	-0.69	-0.003	-0.56
Formal education												
Basic education [b] (*ref.*)												
Secondary education [b]	0.007	0.75	0.007	0.77	0.005	0.53	-0.011	-1.30	-0.013	-1.47	-0.013	-1.41
Tertiary education [b]	0.021	1.89*	0.020	1.84*	0.018	1.62	-0.024	-2.56**	-0.024	-2.61***	-0.024	-2.52**
Incomes												
Money left to save in the household [b]	0.022	2.68***	0.021	2.65***	0.017	2.01**	-0.032	-4.28***	-0.032	-4.31***	-0.031	-3.94***
Job characteristics												
Working hours	0.002	1.34	0.002	1.34	0.002	1.04	-0.004	-2.53**	-0.004	-2.45**	-0.005	-2.76***
Working hours (squared)	-1.9E-05	-1.20	-1.9E-05	-1.20	-1.6E-05	-1.01	2.8E-05	1.90*	2.7E-05	1.86*	3.3E-05	2.18**
Job tenure	-0.011	-4.00***	-0.011	-3.91***	-0.010	-3.31***	-0.009	-3.11***	-0.008	-2.94***	-0.007	-2.29**
Job tenure (squared)	0.001	4.64***	0.001	4.52***	0.001	3.93***	4.9E-04	3.04***	4.4E-04	2.82***	3.6E-04	2.22**
Construction sector (ref.) [b]												
Industrial sector [b]	0.001	0.09	0.001	0.10	0.004	0.32	-0.013	-1.10	-0.014	-1.13	-0.010	-0.75
Services sector [b]	-0.041	-3.30***	-0.041	-3.28***	-0.044	-3.43***	-0.005	-0.48	-0.005	-0.48	-0.006	-0.54
No. observations (No. transitions)	8,380 (1,201)		8,380 (1,201)		7,903 (1,139)		6,912 (945)		6,912 (945)		6,305 (884)	
Log likelihood	-3,290.5		-3,283.8		-3,087.4		-2,512.7		-2,504.2		-2,390.2	

Notes: Country dummies are included in all regressions.
[a] The information for Germany was not collected in the ECHP.
[b] Dummy variable.
* $0.10 > p \geq 0.05$; ** $0.05 > p \geq 0.01$; *** $p < 0.01$

Source: Authors' calculations.

By and large, results for the micro level control variables are in line with theoretical expectations. In particular, the impact of tertiary education and the household's income of own-account workers are consistently positively related to the probability that own-account workers become employers. Similarly, the impact of tertiary education and the household's income of employers are consistently negatively related to the probability that employers become own-account workers.

Regarding our indicator of the labour market regulations at place in a certain country, first, we find a negative impact of EPL on the probability of switching from own-account worker to employer. As the EPL variable is measured as an index, interpretation of the marginal effect is not straightforward. To provide an intuition of the magnitude of the effect, let us provide an illustration. For the twelve countries in our data sample, the average difference between the maximum and minimum value (within one country) over the eight-year period under consideration (1994-2001) is 0.43. The marginal effect in model 1A (–0.068) implies that for a decrease of the index with 0.43, the probability of hiring employees increases with about 2.9%-point. Given that the predicted probability evaluated in the sample means is about 12%, the impact of EPL may be considered substantial. As argued by Parker (2007), EPL imposes sunk costs for self-employed workers who decide to take on employees and our results suggest that this causes many own-account workers to refrain from hiring employees. This result is also consistent with Van Stel et al. (2007) who found that stricter EPL is negatively related to entrepreneurship rates across a sample of 39 countries, and in particular with opportunity entrepreneurship, the type of entrepreneurship that is more likely to employ personnel (compared with necessity entrepreneurship).

Second, concerning firing decisions, the marginal effect shown in model 1B (–0.072) implies that for a decrease in EPL of 0.43 (as above), the probability of

switching from employer to own-account worker increases with about 3.1%-point. As expected, lower employment protection increases the number of job dismissals. Hence, for a realistic decrease in EPL as described above, hiring chances by own-account workers increase by 2.9%-point while firing chances by employers increase by 3.1%-point. These magnitudes may be considered economically relevant. We cannot draw conclusions as to whether hiring or firing decisions dominate as a result of lowering EPL, for two reasons. First, the difference between the two effects is not statistically significant. Second, we do not have information about hirings and firings that may occur within the employer firm category employing 1-4 employees (as an employer who initially employs, for instance, two employees, and then subsequently hires or fires one employee, will still be an employer in the next period).

So, although we cannot draw final conclusions concerning the net employment effect of changes in EPL, it is clear from our empirical analysis that job turnover, and hence the level of labour mobility, increases when EPL decreases: the impact of EPL on both transition probabilities (from own-account worker to employer and vice versa) is highly significant and economically relevant, as demonstrated above.

Finally, when including the *household perception of economic climate* variable in models 2A and 2B, this control variable has the expected positive impact on hiring decisions, while the results for the impact of EPL remain qualitatively the same.[9] Hence, we can safely interpret the coefficient associated to EPL as actually capturing the impact of policy-induced changes in EPL on hiring and firing decisions.

[9] The information about the *household perception of economic climate* for Germany was not collected in the ECHP, which reduces our sample in models 2A and 2B (relative to 1A and 1B, respectively). As a robustness check, models 1A and 1B were also estimated for these reduced samples (i.e., excluding Germany) and results remained unaltered. Results of this robustness test are available on request.

2.5 Conclusions

During deep recessions with big employment losses and decreases in competitiveness, the appropriateness of measures that might lead to employment and productivity growth is a highly relevant policy issue. Our empirical analysis shows that the strictness of EPL is negatively related to the probability that own-account workers take on employees and hence, become employers. On the other hand, we also find that strict EPL lowers the number of job dismissals. These results suggest the existence of a trade-off of higher EPL in terms of benefits for those individuals who have a job (the 'insiders') and those who don't (the 'outsiders'). Although employees are better off in an environment of strict EPL (their rights are better protected), unemployed individuals may actually find it harder to find a job in such an environment as entrepreneurs face higher risks when employing personnel, and hence will less often decide to hire employees.

Although we cannot make final conclusions as to whether hiring or firing decisions dominate as a result of lower EPL, what is clear from our analysis is that lowering EPL is strongly associated with higher labour mobility among the smallest of firms. And since labour mobility has been found to be an important source of knowledge spillovers and productivity growth, (Stephan, 1996; Breschi and Lissoni, 2001; Cooper, 2001; Power and Lundmark, 2004), EPL seems to have a profound impact on micro- and macro-economic outcomes. Therefore, governments may find the piece of evidence provided in the current paper useful when evaluating their labour market regulations.

Chapter 3

Unraveling the relationship between the business cycle and the own-account worker's decision to hire employees

(joint with J. Millán, C. Román and A. van Stel)

Abstract. We study the role of the business cycle in the individual decision of own-account workers to hire employees. Using panel data from the European Community Household Panel for the EU-15 countries, we show that own-account workers are less likely to hire employees during recessions. Next, we focus on identifying the underlying mechanisms of this negative relationship, while bearing in mind that liquidity constraints and unemployment are more common during recessions. First, we observe how liquidity constraints reduce the probability of transitioning from own-account worker to employer. Second, we find that non-higher educated own-account workers who were formerly unemployed are less likely to take on employees compared to those who were formerly in paid employment. This lower likelihood does however not seem to apply to formerly unemployed own-account workers who enjoyed tertiary education. These results suggest that formal education and former work experience are important assets for own-account workers which increase the probability that they create new jobs. This new evidence may be useful for governments aiming to stimulate employment growth.

3.1 Introduction

Due to the financial and economic crisis of 2008, unemployment rates in Europe are currently sky high. The seasonally-adjusted unemployment rate in November 2012 was 10.7% for the EU-27 while it was as high as 11.8% for the euro area (Eurostat 2013). Hence, there is a strong need for economies to create new jobs. An important pool of potential job creators is formed by the own-account workers, i.e. self-employed workers without personnel. Their share in the total labour force for the EU-15 countries was 7.8% in 2008, with country rates varying between 2.8% in Luxembourg and 14.3% in Italy (Van Stel et al. 2012).[1] If a substantial minority of own-account workers would hire just one employee, this would already bring down unemployment considerably. Hence, an important route of stimulating employment may be to persuade own-account workers to take on employees, i.e., to become employer entrepreneurs. This route may be even more promising if one realises that barriers to take on the first employee are often higher than for the second employee, for instance because own-account workers do not have experience yet with employing personnel. Désiage et al. (2011) discuss the existence of a *one-employee threshold* for firms with no employees which they link to the cost of managing a first employee and to legal constraints, such as the restrictions on layoffs. Once an entrepreneur has experience with running a business with personnel (e.g. experience with financial planning to pay a salary every month, experience with administrative burdens associated with employing personnel, etc.), the step to employing more personnel may well be smaller. Indeed, using French data, Désiage et al. (2011) find that the probability for non-employers to hire a first employee is lower than the probability for employers to hire additional employees.

In this paper we study the determinants of the own-account worker's decision

[1] These numbers refer to the private sector excluding own-account workers in agriculture, hunting, forestry and fishing.

to hire employees, by which they become an employer. In doing so, we focus on two phenomena which are more prevalent during economic downturns such as the current one: liquidity constraints and unemployment. First, we investigate if and to what extent hiring of personnel by own-account workers is impeded by liquidity constraints. *Second*, we investigate if and to what extent the previous labour force status of own-account workers plays a role in their decision to take on employees. In particular, we concentrate on whether an individual was unemployed or paid-employed prior to becoming own-account worker, the latter status (paid employment) revealing the possession of former work experience. We also examine whether formal education moderates the relation between previous labour force status and the probability that an own-account worker hires employees.

Considering the previous labour force status of own-account workers as a possible determinant of hiring decisions by these own-account workers has a clear link with employment policy. A well-known policy instrument intended to combat unemployment is to stimulate unemployed individuals to become self-employed, for instance by means of start-up incentive programs (Kluve and Card 2007; Shane 2009; Román et al. 2013).[2] Most individuals becoming self-employed by taking part in such a program will initially become own-account worker (rather than employer entrepreneur). Although the effectiveness of start-up incentive programs is often debated (Santarelli and Vivarelli 2007; Shane 2009; Román et al. 2013), there are also studies pointing at a certain degree of success of such programs (Millán et al. 2012). What at least seems to be clear though is that, if such programs are to be used, there is a need to be selective regarding admission to such programs, in particular when unemployment is high.[3] It would not be wise to admit each and every applicant to start-up

[2] This policy instrument is also emphasised in the recent Entrepreneurship 2020 Action Plan of the European Commission: "Given the significant number of unemployed people across Europe, entrepreneurship support schemes should be put in place to encourage business creation as a route out of unemployment" (European Commission, 2013, pp. 25-26).

[3] The need for selectivity is also recognised by the European Commission as they mention that support

incentive programs, for two reasons. First, the amount of public money spent would become very high, and second, it may lead to an abundance of self-employed which make economies less efficient, thereby hampering economic growth (Carree et al. 2002; Van Stel et al. 2012). Instead, it seems wiser to select applicants on the basis of their probability of transitioning from own-account worker to employer, at least when the policy target is job creation (rather than subsistence). In this regard, the roles of formal education and former work experience are considered in the current paper.

As mentioned, in the current paper we investigate determinants of transitions from own-account worker to employer, while concentrating on the roles of liquidity constraints and unemployment, both of which phenomena are more prevalent during recessions. When examining these transitions, binary logit models are applied to individual level data drawn from the European Community Household Panel for the EU-15 countries. The set-up of this paper is as follows. Sections 2 to 5 respectively discuss earlier literature, empirical methods, estimation results, and, finally, the conclusions of the paper.

3.2 Brief literature review

Although the literatures on liquidity constraints and unemployment or business cycle effects for entrepreneurs are huge (see Stiglitz and Weiss 1981; Evans and Jovanovic 1989; and Hurst and Lusardi 2004, as examples of influential studies dealing with liquidity constraints for entrepreneurs, and Parker 2011, for an overview of influential studies dealing with the relation between entrepreneurship and the business cycle, including studies concentrating on unemployment), the literature on the specific impact of these phenomena on job creation by own-account workers is limited. In

should be targeted at groups with the greatest potential, including unemployed workers with professional skills and competences (European Commission, 2013, p. 26).

fact, the literature on the determinants of job creation by the self-employed is limited anyway: studies that do consider this topic include Carroll et al. (2000), Davis et al. (2009) and Mathur (2010) for the US; Westhead and Cowling (1995), Burke et al. (2000, 2002, 2009), Cowling et al. (2004) and Henley (2005) for the UK; Désiage et al. (2011) for France, and Congregado et al. (2010) and Millán et al. (2011, 2012) for the EU-15. To the best of our knowledge, an analysis of the underlying mechanisms of the negative relationship between the business cycle and the individual decision of own-account workers to hire employees does not exist to date. This is the research gap we are aiming to fill in the current paper.

3.3 Methods

3.3.1 Data

We use data from the European Community Household Panel (henceforth ECHP) covering the period 1994-2001.[4] The ECHP is a standardised multi-purpose annual longitudinal survey carried out at the level of the EU-15.[5] It was designed and coordinated by the Statistical Office of the European Communities (Eurostat). The target population of the ECHP consists of people living in private households in the national territory of each country. This panel offers information on 60,500 nationally representative households, which includes approximately 130,000 individuals aged 16 years and older. One of its attractive features is the high level of comparability across countries and over time. Thus, using the same questionnaire, all members of the selected households in the participating countries are interviewed about issues relating to demographics, labour market characteristics, income, and living conditions. Additional details on the ECHP data can be found in Peracchi

[4] The ECHP data are used with the permission of Eurostat (contract ECHP/2006/09, held with the Universidad de Huelva).

[5] France, Luxembourg and Sweden were excluded from our analysis because these countries presented missing values for several relevant variables.

(2002).

3.3.2 Sample

Conditional on self-classification, the ECHP allows both categories within self-employment (i.e., own-account worker and employer) to be separately identified by combining the information included in two separate questions: the individuals in our dataset were asked about (i) their main activity status (paid employment, self-employment, unpaid work in a family enterprise, education/training, unemployment or inactivity) and (ii) the number of regular paid employees in the local unit of their current job. Thus, those self-employed with 0 employees are considered own-account workers, and those self-employed with 1 or more employees are classified as employers.

Our sample includes men and women aged 18 to 65 who are own-account workers for some particular period and then either change their labour force status to employers or remain as own-account workers at a later period. Workers in the agricultural industries are excluded from the analysis due to the structural differences from the rest of the economy. Finally, all individuals working under 15 hours per week are also excluded.[6] The final dataset, after removing cases with missing data for any of the relevant variables, yields 8,491 observations, of which 1,325 (15.6%) refer to transitions to employer.

3.3.3 Estimation methods

In order to provide a framework for the empirical analysis, we use random effects binary logit models that control for unobserved heterogeneity across individuals (Wooldridge 2002). Unobserved heterogeneity is a concern because if the factors

[6] The information about the number of regular paid employees in the local unit, which enables the distinction between employers and own-account workers, is only available for those individuals working 15 or more hours per week.

that are not explicitly included in the model are correlated with those included, the estimated effects of the latter may be biased. In particular, there may exist some individual-specific heterogeneity, for example, because individuals differ in their intrinsic ability. This ability, not being observed in the data, may affect hiring decisions made by individuals, and therefore the results obtained for the variables included in the regression might partially reflect the effect of this ability. While we cannot observe ability, we can model the presence of this unobserved heterogeneity assuming the presence of an individual-specific random effect. We will report the results following this approach, which show no major changes relative to simple pooled regressions (not shown for brevity, but available on request), thus suggesting that, even if some unobserved heterogeneity may exist, this does not affect our estimates.

3.3.4 Measures

The following variables are used in our analysis. A detailed definition of all our variables and some descriptive statistics are presented in Tables 3.2 and 3.3, respectively (see Appendix).

3.3.4.1. Dependent variable (Data source: ECHP)

The dependent variable is a discrete variable that equals 1 for individuals who are own-account workers in period t and become employers in the same firm in period t+1. It equals 0 for individuals who remain as own-account workers in the same firm in periods t and t+1. We take this last group as the reference category.[7]

[7] Individuals who are own-account worker in period t can also enter a different firm in period t+1 either as employer or own-account worker. Accounting for these observations would increase our data set by 909 observations, of which 168 (18.5%) refer to transitions to employer in a different firm. However, we consider that this is not an advisable strategy because these individuals could be as much successful entrepreneurs (discovering and exploiting better business opportunities) as failed entrepreneurs (who discover that their business opportunity is not as profitable as they expected and simply try again). This heterogeneous composition would make the results non-interpretable.

3.3.4.2. Main explanatory variables (Data source: OECD and ECHP)

3.3.4.2.1. Direct effect *Business cycle:* The role of the business cycle is captured by means of variables at the macro and micro level. At the macro level, we use GDP growth rates (source: OECD Economic Projections) in order to capture the state of the various national economies in the period under study.[8] At the micro level, we use the reported household's general feeling about the present economic situation.[9]

3.3.4.2.2. Indirect effects: 1st and 2nd mechanism *Liquidity constraints:* We also aim to capture the role of liquidity constraints by means of variables at both the macro and micro level. At the macro level, we use national GDP per capita (source: OECD National Accounts) which may be seen as a measure of economic development. At the micro level, we include home ownership in an attempt to measure family assets, and the occurrence of money left to save considering household's income and expenses.[10]

Starting status: The ECHP offers information on whether the individual entered the current labour force spell from unemployment, as compared to other previous labour force statuses which we include in our analysis. Furthermore, we include an interaction term capturing the possibly differential effects of entering own-account work from unemployment for individuals with higher and lower levels of education. Finally, we also include a wider set of variables accounting for the role of previous labour force status: unemployment, inactivity, paid employment and self-employment at a different firm. By doing so, only those individuals that started their current own-account work spell during the sample period are actually included

[8] We have obtained similar results by considering national unemployment and employment growth rates and national output gaps (OECD) as alternative measures of macroeconomic conditions.

[9] Unfortunately, this information was not collected for Germany in the ECHP which leads us to exclude this country from the specific part of our analysis which uses this variable.

[10] We obtained similar results when using other proxies at the micro level: relative earnings compared to last year's level and the ability to make ends meet.

in our sample.[11]

3.3.4.3. Control variables (Data source: ECHP)

The empirical models include a set of explanatory variables at the individual (micro) level that are known to influence entrepreneurial performance (see Parker 2009, and Millán et al. 2012, for overviews): demographic characteristics (gender, age, marital status and number of children), formal education, employment characteristics (hours of work, experience and business sector) and country dummies, the latter accounting for structural differences between countries which possibly affect the probability of hiring employees.

3.4 Results and discussion

Estimation results are presented in Table 3.1 by using eight different specifications. Our baseline model includes all control variables. Models I and II are used to test the *direct effect* of the business cycle on the transitions from own-account worker to employer. Models III and IV are used to capture the role of liquidity constraints (*indirect effect: 1st mechanism*). Finally, the role of previous labour force status (*indirect effect: 2nd mechanism*) is analysed in Models V, VI and VII. Each specification is presented in a two-column format. The first column shows the marginal effects, but expressed in relative terms (with respect to predicted probabilities for sample means) whereas t-statistics associated with these marginal effects are presented in the second column.[12]

[11] As a consequence, Germany and The Netherlands are excluded from our analysis when using these variables.

[12] The robustness of our t-statistics has been checked by re-estimating them from variance-covariance matrices of the coefficients obtained by bootstrapping.

3.4.1 Main results

We find that economic growth has a clear positive impact on the likelihood of entering employership from own-account work. In particular, we observe that the probability of hiring employees increases by about 32.6% when GDP growth rates increase by one percentage point (see Table 3.1, Model I). We also obtain a positive cyclical effect on transitions from own-account worker to employer when using the reported household's general feeling about the present economic situation. Our results show that the predicted probability of switching from own-account self-employment to employer increases by 17.3% when this variable increases by one unit (on a discrete 1-2-3 scale) (see Table 3.1, Model II). Hence, the impact of the household's general feeling about the present economic situation may be considered substantial. These results, which use both a micro level and a macro level indicator of the business cycle, support the importance of expansionary periods for recruiting personnel or, in other words, our results show that own-account workers are less likely to hire employees during recessions.

Next, we try to identify the underlying mechanisms of the negative relationship between the business cycle and the probability of own-account workers to take on employees. We *first* analyze the role of liquidity constraints (also captured by means of both micro and macro proxies), which are more likely during recessions. At the macro level, we observe that transitions to employer increase by about 46% with each additional 1,000 PPP US$ of 1990 increase in GDP per capita (see Table 3.1, Model III). As regards our micro level variables, both home ownership and the occurrence of money left to save (considering a household's income and expenses) also have a positive effect on transitions. Thus, the probability of switching to employer increases by 19.5% when own-account workers are home owners and by 14.6% when there is money left to save in the household (see Table 3.1, Model

IV). In this regard, home ownership might be important for entrepreneurs who require outside labour because a house is often used as collateral when an individual applies for a loan from a bank. Results from Models III and IV both point at the importance of liquidity for expanding the business with outside labour. Therefore, the implementation of policies that increase access to credit for self-employed in economic downturns, particularly for the smallest SMEs, seems to be of paramount importance as a way to increase job-creation and hence combat unemployment.[13] As providing small loans is often not efficient for banks, and access to bank loans is therefore often denied to these smallest firms (Cressy 1996, 2000; Levenson and Willard 2000; Freel 2007), there seems to be a clear role for policy intervention.

Second, we examine whether entering own-account work from unemployment (as compared to other previous labour force statuses, the most common one being paid employment) influences transitions to employership. From a policy point of view the answer to this question is relevant since own-account work entries from unemployment are more likely during recessions (Román et al. 2013). Our results show that entering own-account work from unemployment decreases the probability of switching to employer by only 9%. In accordance with this small magnitude, the result is not significant (see Table 3.1, Model V). When we allow for a moderating effect of tertiary education (see Table 3.1, Model VI), results suggest that this non-significant negative effect of entering own-account work from unemployment on job creation is the net result of two opposite effects of this variable for the groups of own-account workers with and without higher education. For the latter group, i.e., for non-higher educated own-account workers, the probability of switching to employer decreases by about 14% for those who were formerly unemployed, as compared to those starting from other statuses, i.e. mainly paid-employment. This effect is significant at

[13] Note that own-account workers who take on employees will almost always still belong to the smallest firm category.

5% level. For own-account workers with tertiary education, however, we obtain a non-significant positive effect of entering from unemployment as compared to other prior statuses.[14] Stated otherwise, higher education seems to remove the negative effect of starting own-account work from unemployment on later hiring decisions. The policy implications are quite direct, in the light of these results. Thus, start-up incentives and higher education policies should be considered in tandem with each other if governments want to promote a type of self-employment that contributes to the job generation process.

As a refinement of Models V and VI, we also include a wider set of variables accounting for the role of previous labour force status. As argued in subsection 3.4.2.2, only those individuals who started their current own-account work spell during the sample period are included in this particular sample. This reduces our dataset to 1,573 observations, of which 303 (19.3%) refer to transitions to employer. The advantage is that we can make a distinction between starting statuses other than unemployment, i.e. we know whether the own-account workers were formerly unemployed, inactive, paid-employed or entrepreneur in a different firm. When doing so, we obtain that the probability of switching to employer for those who entered own-account work from paid employment increases by 33.7% as compared to those entering from unemployment (see Table 3.1, Model VII). This result seems to emphasise the importance of former work experience obtained as a paid employee. Apparently, own-account workers are more likely to take on employees if they have formerly worked as an employee themselves.

[14] The probability of switching to employer increases by (28.4% - 14.3% > 0) for this group. This effect is not significant though as its p-value is 0.174.

Table 3.1. Transitions from own-account work to employer

	Direct Effect						Indirect effect: 1st mechanism				Indirect effect: 2nd mechanism					
	Baseline		Model I		Model II		Model III		Model IV		Model V		Model VI		Model VII	
Predicted probability (*y*)	0.1338		0.1279		0.1253		0.1199		0.1194		0.1338		0.1337		0.1778	
Independent variables (*x*)	$\frac{dy/dx}{y}$%	t-stat.	$\frac{dy/dx}{y}$%	t-stat.	$\frac{dy/dx}{y}$%	t-stat.	$\frac{dy/dx}{y}$%	t-stat.	$\frac{dy/dx}{y}$%	t-stat.	$\frac{dy/dx}{y}$%	t-stat.	$\frac{dy/dx}{y}$%	t-stat.	$\frac{dy/dx}{y}$%	t-stat.
Business cycle																
GDP growth rate (%)			32.6	10.57***	29.2	9.17***										
General feeling about present economic situation (1-3) [a]					17.3	4.34***										
Liquidity constraints																
GDP per capita ('000)							45.9	12.76***	45.4	12.6***						
Dwelling owner [b]									19.5	2.76***						
Money left to save in the household [b]									14.6	2.09**						
Starting status (Models V-VI)																
Other starting statuses [b] (*ref.*)																
Unemployment [b]											-9.0	-1.43	-14.3	-2.07**		
Unemployment x Tertiary education [b]													28.4	1.57		
Starting status (Model VII)																
Unemployment [b] (*ref.*)																
Inactivity [b]															24.7	1.12
Paid employment [b]															33.7	1.93*
Different firm [b]															9.9	0.61
Demographic characteristics																
Female [b]	-6.2	-0.97	-7.5	-1.14	-8.5	-1.22	-4.6	-0.64	-5.6	-0.77	-6.4	-1.00	-7.0	-1.09	-22.9	-1.81*
Age (*18-65*)	-0.9	-0.37	-1.0	-0.42	-1.0	-0.37	0.2	0.08	0.4	0.16	-0.8	-0.35	-0.8	-0.32	6.6	1.36
Age (squared)	-0.004	-0.15	-0.002	-0.08	-0.002	-0.07	-0.021	-0.63	-0.024	-0.74	-0.005	-0.17	-0.006	-0.21	-0.102	-1.63
Cohabiting [b]	13.1	1.80*	13.1	1.74*	13.0	1.64	12.8	1.57	12.7	1.55	13.1	1.80*	13.0	1.78*	-1.9	-0.13
Number of children under 14	-2.4	-0.73	-1.9	-0.56	-1.9	-0.52	-1.5	-0.40	-1.2	-0.33	-2.5	-0.75	-2.4	-0.73	-5.2	-0.72
Formal education																
Basic education [b] (*ref.*)																
Secondary education [b]	10.4	1.44	9.2	1.24	6.6	0.86	10.7	1.33	9.8	1.23	10.7	1.49	10.8	1.5	15.8	1.09
Tertiary education [b]	26.2	2.96***	27.4	2.97***	26.1	2.68***	28.2	2.79***	26.2	2.59***	26.1	2.95***	18.5	1.92*	55.1	2.73***
Job characteristics																
Working hours	1.4	0.96	0.9	0.62	0.9	0.60	1.6	1.01	1.4	0.91	1.3	0.91	1.4	0.95	-2.3	-0.85
Working hours (squared)	-0.011	-0.89	-0.007	-0.53	-0.009	-0.65	-0.012	-0.88	-0.011	-0.78	-0.011	-0.85	-0.011	-0.89	0 025	1.08
Job tenure	-8.4	-3.93***	-8.3	-3.74***	-7.6	-3.29***	-5.6	-2.35**	-6.1	-2.52**	-8.8	-4.06***	-8.7	-4.03***	-26.4	-1.73*
Job tenure (squared)	0.6	4.53***	0.5	4.26***	0.5	3.81***	0.4	2.75***	0.4	2.88***	0.6	4.62***	0.6	4.58***	3.9	1.62
Construction sector [b] *(ref.)*																
Industrial sector [b]	-0.3	-0.03	-0.5	-0.04	1.7	0.14	1.2	0.10	1.4	0.11	-0.1	-0.01	0.04	0.01	2.7	0.13
Services sector [b]	-36.7	-3.76***	-38.1	-3.72***	-42.6	-3.91***	-42.7	-3.75***	-43.8	-3.82***	-36.4	-3.73***	-35.7	-3.66***	-33.5	-1.85*
No. observations (No. transitions)	8,491 (1,325)		8,491 (1,325)		7,998 (1,247)		8,491 (1,325)		8,491 (1,325)		8,491 (1,325)		8,491 (1,325)		1,573 (303)	
Log pseudolikelihood	-3,523.5		-3,464.8		-3,248.4		-3,430.6		-3,424.3		-3,522.5		-3,521.1		-734.7	

Notes: Country dummies are included in all regressions; * $0.1 > p \geq 0.05$; ** $0.05 > p \geq 0.01$; *** $p < 0.01$; [a] The information for Germany was not collected in the ECHP; [b] Dummy variable

3.4.2 Controls

As regards our results for the micro level control variables, first, we find a positive relationship between higher education and the probability that own-account workers expand their labour force. This effect is quite strong. Furthermore, we find a non-linear, U-shaped, impact of job tenure on transitions to employer where the turning point is reached when the length of the spell as own-account worker is about 7.7 years (i.e., after 7.7 years the likelihood of employing personnel increases). Finally, regarding the sector of economic activity, we observe that the probability of becoming employer is lower for own-account workers in services sectors than it is for those working in the industrial and construction sectors. This probably reflects the lower scale of operations in services sectors, so that it is quite possible to maintain a business without employees. In manufacturing, on the contrary, economies of scale are much more important so that the own-account worker status is almost by definition a transitory stage (Van Stel et al. 2012).

Robustness checks

The validity of our results has been checked by performing a couple of robustness checks. As regards the role of the business cycle, the results are independent of the way macroeconomic conditions are included in the models, as indicated in footnote 8. Concerning liquidity constraints, our results are robust to the inclusion of alternative households' income measures, as indicated in footnote 10.

3.5 Conclusions

During deep recessions with big employment losses, the appropriateness of different routes to stimulate employment growth is a highly relevant policy issue. In the present paper, we study one such route, viz., the individual decision of own-account workers to hire employees. We examine the determinants of this decision, while

focusing particularly on determinants related to recessions. Using panel data from the European Community Household Panel for the EU-15 countries, we show that own-account workers are less likely to hire employees during recessions. Next, we focus on identifying the underlying mechanisms of this negative relationship, while bearing in mind that liquidity constraints and unemployment are more common during recessions. *First*, we observe how liquidity constraints reduce the probability of transitioning from own-account worker to employer. *Second*, we find that non-higher educated own-account workers who were formerly unemployed are less likely to take on employees compared to those who were formerly in paid employment. This lower likelihood does however not seem to apply to formerly unemployed own-account workers who enjoyed tertiary education. These results suggest that formal education and former work experience are important assets for own-account workers which increase the probability that they create new jobs. This new evidence may be useful for governments aiming to stimulate employment growth. In particular, our results suggest that, in order to mitigate the negative consequences of recessions on job creation by own-account workers, it is important to (i) facilitate access to credit for the smallest SMEs, and (ii) consider formal education and former work experience as possible admission criteria for individuals applying for participation in start-up incentive programs.

3.6 Appendix

Table 3.2. Variable description table

Variable	Description
	Dependent variable
Transitions from own-account work to employer	Dependent variable equals 1 for individuals who are own-account worker in period t and become employer in the same firm in period t+1. The variable equals 0 for individuals who remain as own-account workers in the same firm in periods t and t+1. We take this last group as the reference category.
	Independent variables
Business cycle	
GDP growth rate	Real GDP growth rates (source: OECD Economic Projections).
General feeling about present economic situation	Discrete variable equalling 1, 2 or 3; the scale refers to the household's general feeling about the present economic situation for making large purchases. This variable (i) equals 1 for households considering the present economic situation is unfavourable for making large purchases; (ii) equals 2 for households considering the present economic situation not favourable but also not unfavourable for making large purchases; and (iii) equals 3 for households considering the present economic situation is favourable for making large purchases.
Liquidity constraints	
GDP per capita	Real GDP per capita expressed in thousands of PPP US$ of 1990 (source: OECD National Accounts).
Dwelling owner	Dummy equals 1 for households owning the dwelling.
Money left to save in the household	Dummy equals 1 for households able to save regularly some money considering household's income and expenses.
Starting status (Models V-VI)	
Other employment statuses	Dummy equals 1 for individuals entering own-account work from other employment statuses such as inactivity, paid employment or self-employment in a different firm.
Unemployment	Dummy equals 1 for individuals entering own-account work from unemployment.
Starting status (Model VII)	
Unemployment	Dummy equals 1 for individuals entering own-account work from unemployment.
Inactivity	Dummy equals 1 for individuals entering own-account work from inactivity
Paid employment	Dummy equals 1 for individuals entering own-account work from paid employment
Different firm	Dummy equals 1 for individuals entering own-account work from self-employment in a different firm
Demographic characteristics	
Female	Dummy equals 1 for females.
Age	Age reported by the individual.
Cohabiting	Dummy equals 1 for cohabiting individuals.
Number of children under 14.	Number of children younger than 14 living within the household
Formal education	
Basic education	Dummy equals 1 for individuals with less than second stage of secondary level education (ISCED-1997, 0-2).
Secondary education	Dummy equals 1 for individuals with second stage of secondary level education (ISCED-1997, 3).
Tertiary education	Dummy equals 1 for individuals with recognized third level education (ISCED-1997, 5 or 6).

Job characteristics	
Working hours	Hours of work per week.
Job tenure	Number of years as own-account worker in present job.
Construction sector	Dummy equals 1 for individuals whose code of main activity of the local unit of the business is F (construction), by the Nomenclature of Economic Activities (NACE-93).
Industrial sector	Dummy equals 1 for individuals whose codes of main activity of the local unit of the business are C (mining and quarrying), D (manufactures) and E (electricity, gas and water supply), by the Nomenclature of Economic Activities (NACE-93).
Services sector	Dummy equals 1 for individuals whose codes of main activity of the local unit of the business are G (wholesale and retail trade; repair of motor vehicles, motorcycles and personal/household goods), H (hotels and restaurants), I (transport, storage and communication), J (Financial intermediation), K (real estate, renting and business activities), L (public administration and defense; compulsory social security), M (education), N (health and social work) and O-Q (other community, social and personal service activities; private households with employed persons; extra-territorial organizations and bodies), by the Nomenclature of Economic Activities (NACE-93). 93).
Country dummies	Dummy equals 1 for individuals whose codes of main activity of the local unit of the business are 12 dummies equalling 1 for individuals living in the named country: Austria, Belgium, Denmark, Finland, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, and the United Kingdom.

Table 3.3. Descriptive statistics

Model	**Baseline A**		**Model 1A**	
No. observations/ transitions	7,166		1,325	
Independent variables (x)	Mean	SD	Mean	SD
Business cycle				
GDP growth rate (%)	3.51%	1.74	4.03%	1.92
Household perception of economic climate *(1-3)* [a]	1.72	0.76	1.85	0.76
Liquidity constraints				
GDP per capita (PPP US$ of 1990)	$13,621	3,981	$13,340	4,114
Dwelling owner [b]	76.8%		80.2%	
Money left to save in the household [b]	35.4%		36.5%	
Starting status				
Unemployment [b]	28.0%		25.8%	
Demografic characteristics				
Female [b]	29.8%		27.0%	
Age *(18-65)*	39.8	9.5	38.6	9.2
Cohabiting [b]	78.4%		78.5%	
Number of children under 14	0.72	0.94	0.76	0.95
Formal education				
Basic education [b]	49.2%		42.9%	
Secondary education [b]	30.7%		34.5%	
Tertiary education [b]	20.1%		22.6%	
Job characteristics				
Working hours	51.0	12.9	51.2	12.5
Job tenure	6.8	4.5	6.8	4.8
Construction sector [b]	12.8%		15.2%	
Industrial sector [b]	10.4%		14.3%	
Services sector [b]	76.8%		70.4%	

Notes: [a] The information for Germany was not collected in the ECHP; [b] Dummy variable

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